INPUT

MARKET FORECAST

U.S. Applications Solutions Markets

1993-1998

U.S. Market Analysis Program

DECEMBER 1993

U.S. APPLICATIONS SOLUTIONS MARKETS

1993-1998

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D-35428 Langgöns-Niederkleen
Germany
Tel. +49 (0) 6447-7229
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London
17 Hill Street
London W1X 7FB
England
Tel. +44 (0) 71 493-9335
Fax +44 (0) 71 629-0179

New York
400 Frank W. Burr Blvd.
Teaneck, NJ 07666
U.S.A.
Tel. 1 (201) 801-0050
Fax 1 (201) 801-0441

Paris
24, avenue du Recteur Poincaré
75016 Paris
France
Tel. +33 (1) 46 47 65 65
Fax +33 (1) 46 47 69 50

San Francisco
1881 Landings Drive
Mountain View
CA 94043-0848
U.S.A.
Tel. 1 (415) 961-3300
Fax 1 (415) 961-3966

Tokyo
Saida Building, 4-6,
Kanda Sakuma-cho
Chiyoda-ku, Tokyo 101
Japan
Tel. +81 3 3864-0531
Fax +81 3 3864-4114

Washington, D.C.
1953 Gallows Road
Suite 560
Vienna, VA 22182
U.S.A.
Tel. 1 (703) 847-6870
Fax 1 (703) 847-6872

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Abstract

This applications solutions annual report provides an analysis and five-year forecast of the U.S. applications software products and turnkey systems markets for the period 1993-1998. Forecasts are provided by delivery submode and by platform for both software products and turnkey systems.

The five-year forecast, using a base year of 1992, covers 15 industry-specific and seven cross-industry sectors for each of the two market segments. The report discusses issues and trends and offers recommendations for vendors who wish to take advantage of the forces driving these markets.

The report contains 180 pages and 75 exhibits.

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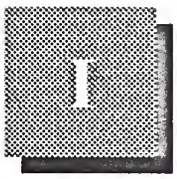


Introduction

This report is one of a series of market analysis reports prepared each year by INPUT for the key segments (delivery modes) of the U.S. information services industry. These delivery modes are:

1. Professional Services
2. Systems Integration
3. Systems Operations (outsourcing)
4. Processing Services
5. Network Services
6. Systems Software Products
7. Applications Software Products
8. Turnkey Systems
9. Equipment Services

The first seven delivery modes are covered in reports included as part of INPUT's Market Analysis Program (MAP), a planning service for information services vendors. The last two delivery modes are covered in market analysis reports included in INPUT's Systems Integration and Outsourcing programs.

A
Purpose and Organization

1. Purpose

This report analyzes the application solutions market, which comprises the applications software products and turnkey systems delivery modes of the U.S. information services industry.

- The report includes five-year forecasts and analyses, an assessment of market drivers, analysis of competitive trends, and identification of leading vendors.

- The report assesses trends and events within the U.S. economy, the U.S. information services industry, and the application solutions delivery mode to provide the reader with a comprehensive foundation for understanding this market sector and for anticipating future directions.

The report provides readers with insights and information that will help them:

- Review the forces shaping the market
- Develop internal corporate financial projections
- Identify new markets and product and services opportunities
- Assess competitive trends
- Determine potential market directions
- Assist in prioritizing investments

2. Organization

This report is organized as described in Exhibit I-1. Each delivery mode report within the Market Analysis Program follows this format. The industry and cross-industry sector reports, described below, follow a very similar format.

EXHIBIT I-1

Market Reports Format

I. Introduction
- Introduction and definition of the delivery mode and its substructure or segments.

II. Executive Overview
- Synopsis of the entire report, written at the end of the year.

III. Information Systems Environment
- The information systems environment and user perspective as it relates to the specific delivery mode or market.

IV. Trends and Issues
- An assessment of the delivery mode from the vendor point of view.

V. Information Services Market Forecast
- Presentation of the information services market forecast by delivery mode and submode.

VI. Competitive Environment
- Discussion of the competitive environment for information services within this delivery mode with market share analysis and vendor profiles.

VII. Conclusions and Recommendations
- Summary of risks and opportunities.

A. Forecast Database
- A detailed forecast by delivery mode, submode, and industry/cross-industry sector. Contains a reconciliation to the previous year's Appendix A.

B
Scope and Methodology

1. Scope

This report addresses the U.S. information services industry for the application solutions market. It includes user expenditures that are noncaptive and generally available to vendors. Many large organizations have portions of their information services requirements satisfied by internal divisions. The resulting expenditure is not available for competitive bid by the general vendor community and is not included in INPUT's projections. The noncaptive distinction is important and is addressed in more detail in INPUT's Definition of Terms.

a. Information Services Industry Structure

Exhibit I-2 defines the structure of the information services industry as used by INPUT in its market analysis and forecasts. The industry consists of nine delivery modes, each of which contains a number of submodes.

EXHIBIT I-2

- *Service Delivery Modes* are specific products and services that satisfy a given user need. *Market Sectors* specify who the buyer is and *Service Delivery Modes* specify what the user is buying.

- INPUT develops a five-year forecast for the delivery mode and each of the submodes.

INPUT also publishes market sector reports analyzing 15 industry and seven cross-industry market sectors. These reports, published annually by INPUT, analyze the information services opportunities in industry sectors—such as insurance, transportation and discrete manufacturing—and in cross-industry sectors—such as accounting, human resources and office systems.

The relationship between delivery mode forecasts and market sector forecasts is shown in Exhibit I-3.

EXHIBIT I-3

Delivery Mode versus Market Sector Forecast Content

Service Delivery Mode	Submode	Market Sectors		
		Industry Sectors	Cross-Industry Sectors	Other
Processing Services	Transaction Utility Other	X	X	 X X
Turnkey Systems		X	X	
Applications Software Products		X	X	
Systems Operations	Platform Applications	X X		
Systems Integration		X		
Professional Services		X		
Network Services	Network Applications Electronic Information Services	X X		X
Systems Software Products				X

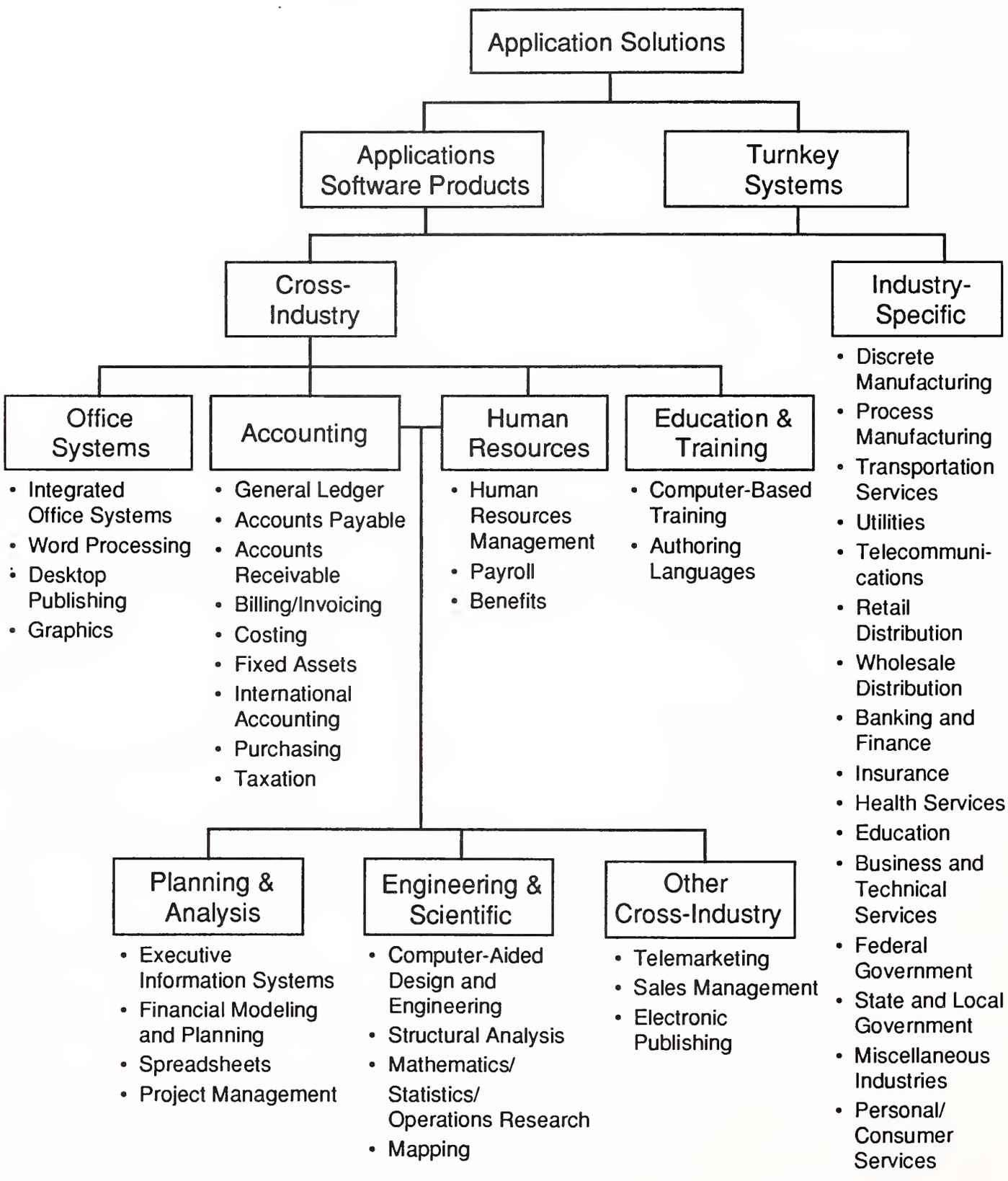
For a more complete discussion of INPUT's information services industry structure and market sector definitions, please refer to INPUT's Definition of Terms.

b. Delivery Mode Description

As shown in Exhibit I-4, application solutions is composed of the applications software products and turnkey systems delivery modes. Each delivery mode is analyzed by the cross-industry and industry-specific markets to which it is sold.

EXHIBIT I-4

Applications Solutions Market Structure



Application solutions are prepackaged or standard solutions to common business applications. These applications can be either industry-specific (e.g., a turnkey system for a law office) or cross-industry (e.g., human resources software). In general, application solutions services involve minimal customization by the vendor, and allow the user to handle a specific business application without having to develop or acquire a custom system or system resources. Exhibit I-4 is a diagram of the market structure for application solutions, including applications software products and turnkey systems.

Although application solutions include three delivery modes—applications software products, turnkey systems and processing services—only the first two are included in this report. INPUT has combined these two delivery modes into one report this year because of their similarities and the trend toward unbundling turnkey systems so that hardware, applications software and services are sold separately. In this report, the term application solutions refers to applications software products and turnkey systems. Processing services is the subject of a separate INPUT Market Analysis Program report.

i. Applications Software Products

Applications software is packaged software purchased for in-house computer systems.

- Industry-specific applications software products perform functions related to fulfilling business or organizational needs unique to a specific vertical market and sold to that market only. Examples include demand deposit accounting, MRPII, medical record keeping and automobile dealer parts inventory.

- Cross-industry applications software products perform a specific function that is applicable to a wide range of industry sectors. Applications include payroll and human resource systems, accounting systems, word processing and graphics systems.

User expenditure forecasts include lease and purchase expenditures, as well as expenditures for work performed by the vendor to implement or maintain the package at the users' sites. Vendor-provided training or support in operation and use of the package, if bundled in the software pricing, is also included.

Expenditures for work performed by organizations other than the package vendor are counted in the category of professional services. Fees for work related to education, consulting and/or custom modification of software products are counted as professional services, provided such fees are charged separately from the price of the software product itself.

User expenditures on applications software products purchased for resale by other delivery modes—namely, turnkey systems vendors, VARs (value-added resellers) and systems integrators—are excluded from applications software forecasts. However, where turnkey systems vendors have unbundled their products and sell applications software separately from the hardware, the applications software expenditures are included in applications software forecasts. Applications software products sold through other channels, however, such as through computer retailers, are included in the user expenditure forecasts.

ii. Turnkey Systems

A turnkey system is an integration of equipment (CPU, peripherals, etc.), systems software, and packaged or custom applications software into a single system developed to meet a specific set of user requirements. The turnkey vendor adds value in software and support services, often providing the applications software and customizing services. Most CAD/CAM systems and many small business systems are turnkey systems.

Hardware vendors that combine software with their own general-purpose hardware are not classified by INPUT as turnkey vendors. Their software revenues are included in the appropriate software category.

The distinction between a turnkey system vendor and a value-added reseller (VAR) has become fuzzy, and the two terms are used interchangeably. IBM invented the term "value-added reseller" in the mid-1980s when it introduced its first workstation. It wanted to emphasize the value-added aspect of this distribution channel rather than sell its workstations through original equipment manufacturers (OEMs) that bring to mind added value in the sense of customization and services.

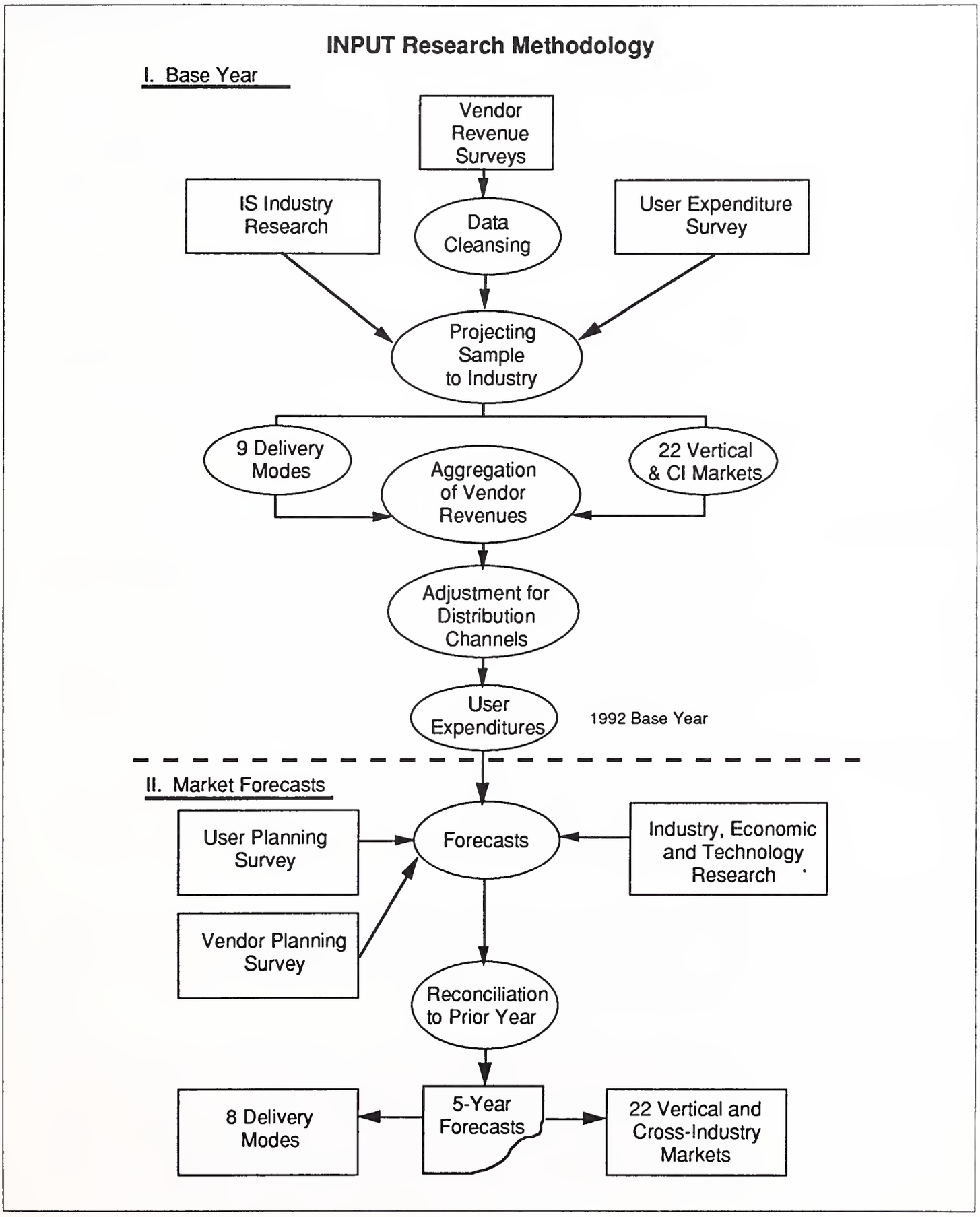
Increasingly turnkey systems vendors/VARs also provide systems integration services, acquiring software products as well as equipment from other vendors.

As with applications software products, turnkey systems are divided into two categories—industry-specific systems and cross-industry systems.

2. Methodology

INPUT's methodology for market analysis and forecasting is summarized in Exhibit I-5. As in past years, INPUT has continued to survey information services vendors to determine their U.S. information services revenues, and to query information systems organizations about expenditures and outside services acquisition plans.

EXHIBIT I-5



INPUT's annual forecasting process is broken into two major parts: base-year expenditure calculations and market forecasts. Each is briefly described below.

a. Base-Year Expenditure Calculations

- INPUT determines previous-year information services revenues for the nine delivery modes and 22 industry and cross-industry sectors for hundreds of vendors. Estimates rely upon interviews, public data and INPUT's own estimates.
- The initial data are projected to represent the entire information services industry.
- Adjustments are made to eliminate duplications due to distribution channel overlap and to assure that captive information services expenditures are not included.
- The result is a base-year (1992) user expenditure for each of the 22 vertical and cross-industry sectors and the nine delivery modes.

b. Market Forecasts

- In the forecasting step, INPUT surveys information systems executives to determine their projected expenditure levels, both in aggregate and for each of the outside information services categories.
- The result is a five-year forecast for each of the 22 vertical and cross-industry sectors and the nine delivery modes. The delivery mode and market sector forecasts are correlated according to the diagram in Exhibit I-3.

To complete the process, INPUT reconciles its new forecasts with those from the previous year. Differences due to market restructuring and other factors are explained. One may use these projections to track INPUT's forecasts from year to year.

INPUT forecasts are presented in current dollars (i.e., 1997 market sizes are in 1997 dollars, including inflationary forecasts). In developing the five-year forecasts, INPUT has incorporated economic assumptions for the U.S. economy as a whole.

The GDP and GDP deflator growth rates used in INPUT's market projections for 1993 through 1998 are from the CONSENSUS™ forecast, a product of Blue Chip Economic Indicators of Sedona, Arizona. The Blue Chip CONSENSUS forecast is derived from a panel of economists representing leading financial, industrial and research firms across the U.S. and has an impressive record of balanced and accurate projections.

C
Related Reports

Related reports of interest to the reader include:

1. U.S. Markets

- U.S. Processing Services Market Analysis Report, 1993-1998
- U.S. Systems Software Products Market Analysis Report, 1993-1998
- U.S. Professional Services Market Analysis Report, 1993-1998
- U.S. Systems Integration Market Analysis Report, 1993-1998
- U.S. Systems Operations Market Analysis Report, 1993-1998
- U.S. Industry Sector Markets, 1993-1998 (15 reports on all major industry sectors—e.g., insurance)
- U.S. Cross-Industry Sector Markets, 1993-1998 (seven reports on information services markets that serve all vertical industry sectors—e.g., accounting)

2. European Markets

- The European Market for Computer Software and Services, 1993-1998
- Systems Software Products—Europe, 1993-1998
- Systems Integration Market Forecast—Europe, 1993-1998
- Systems Operations Market Forecast—Europe, 1993-1998
- European Network Services Market, 1993-1998

The European markets are also analyzed on a vertical basis for discrete and process manufacturing, insurance, banking and finance, and retail and wholesale distribution.

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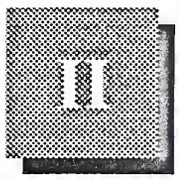


Executive Overview

The applications solutions market is defined by INPUT as two delivery modes: applications software products and turnkey systems.

In this Executive Overview, INPUT provides a summary of trends and issues that will impact applications solutions over the next five years. This chapter presents overall growth projections for applications software products and turnkey systems, outlines the significant market trends and makes recommendations for vendors on product and services strategic development.

A

Information Technology Trends

Major trends that will impact the direction of applications solutions products and services over the next five years are summarized in Exhibit II-1.

EXHIBIT II-1

Emerging Applications Solutions Products and Services Trends

- Downsizing
- Declining packaged software pricing
- Alternative distribution channels
- Increasing importance of professional services
- Technological complexity and user confusion
- Outsourcing of application development and maintenance

Downsizing: While reliance on mainframe and midrange systems persists, users are embracing the concept of downsizing. The need to reduce costs and gain greater access to corporate data for individual users is driving this migration. The majority of IS decision makers INPUT interviewed in 1993 indicated they are either currently using, planning or considering adopting of a client/server architecture.

There has been a leading/lagging pattern throughout the applications solutions industry on the timing of client/server new product development. However, a recent INPUT survey of leading applications solutions vendors indicated that client/server was definitely the leading product development trend over the next five years.

Declining Packaged Software Prices: Over the past year, in particular, software pricing in many market submodes has declined significantly. Software pricing historically has been much more stable than hardware pricing, and generally pricing of new software products had at least kept up with inflation.

Factors that contribute to the declining price trends now in evidence include: unusually sharp price declines in PC hardware pricing over the past year; lower PC software pricing with increased availability of product suites; and competitive impact of downsizing requiring vendors of legacy platform software products to price their products through mechanisms such as alternative licensing agreements, not based on tiered hardware prices.

The trend to lower software prices is expected to continue as client/server downsizing accelerates over the next five years. This will require software vendors to find ways to lower their infrastructure costs and to increase the efficiency of new software development by the use of the more advanced programming paradigms, such as object-oriented technology.

Alternative Distribution Channels: Continuing declines in software pricing require independent software vendors and turnkey vendors to evaluate alternative marketing and support programs to acceptable levels of profitability. INPUT's recent vendor survey indicated an increasing interest in strategic partnerships for such purposes. Some of the more frequently mentioned types of recent partnerships were with computer systems (equipment) vendors and systems software companies—in particular, leading RDBMS (Relational Database Management System) companies. Also, partnerships are developing among applications software vendors to cooperate on interproduct operability to reduce the ever-increasing complexity of product support, particularly on computer networks.

INPUT suggests that independent software vendors team with large systems companies as part of a total solutions products delivery. In effect, this could reverse the traditional VAR relationships between hardware and software companies, with computer systems companies becoming turnkey systems/VARs by reselling the products of the independent software companies.

The largest available market for applications solutions is the corporate in-house application development market. This represents more than half of the available market for applications solutions. To address this market, large vendors that can provide easily customized total solutions are probably best positioned to penetrate this market.

Increasing Importance of Professional Services: As software and hardware prices continue to decline, vendors must provide additional services to enhance revenues. Consulting, application development, customized solutions, outsourcing and systems integration should be considered. However, profit margins of many professional services are lower than for software; thus, vendors must look at ways to provide value-added services. Expertise in application development tools and in particular vertical markets will help justify value-added pricing. Also, strategic partners will become increasingly important in helping market applications solutions to in-house developers more productively.

Technological Complexity and User Confusion: There is a great deal of confusion on the part of buyers as to proper courses of action and how to implement them. Even within IS organizations, executives report that one of their greatest challenges is knowing how to balance investing in new technologies that will support the company's business goals against cost and selecting the "wrong" technology.

Vendors and users are having to cope with "emerging technologies," most of which might be considered first generation. As such, there have been delays in making decisions on courses of action.

Complexity issues have a lot to do with lack of vendor consensus on standards, which would provide for greater interoperability of products and longer-term product models. Vendor consortiums on distributed processing solutions and increasing adoption of object-oriented application development tools should help reduce complexity and provide more paradigm implementation stability.

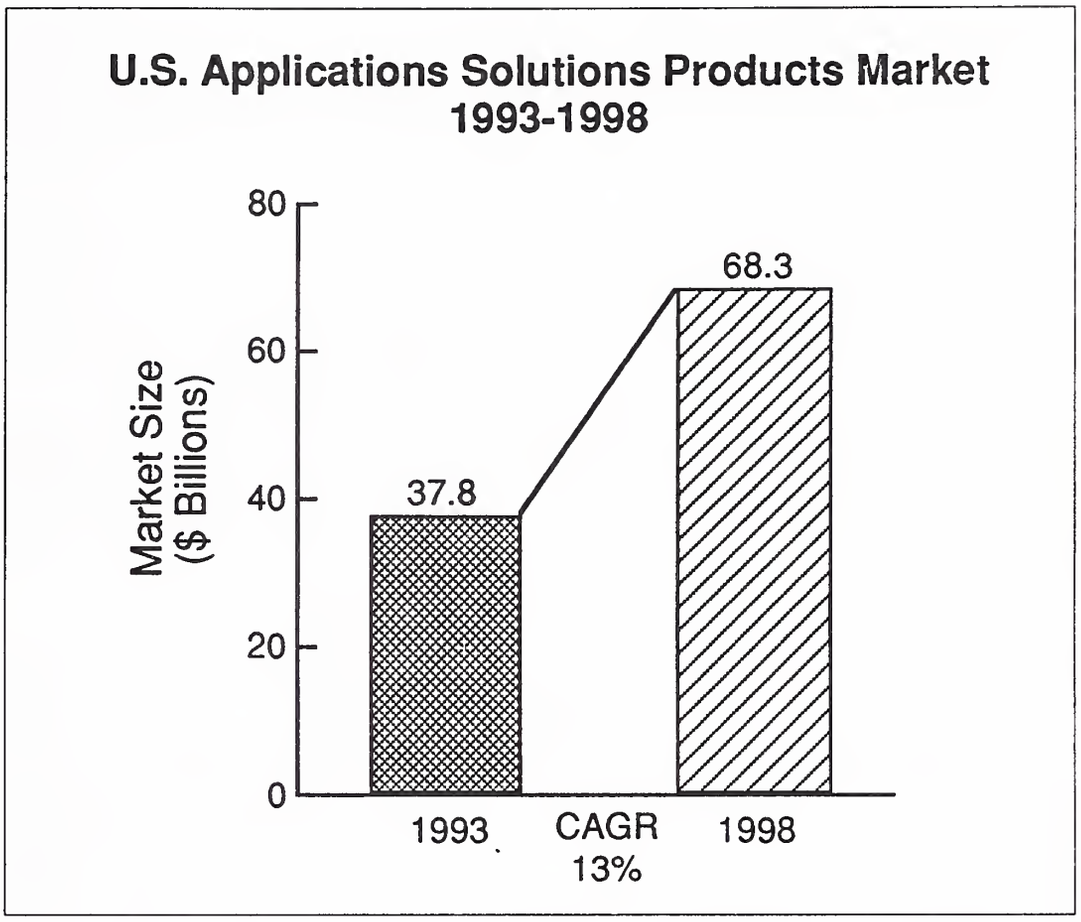
Outsourcing of application development and maintenance: The increasing complexity of applications solutions in a distributed, enterprise-wide computing environment should ultimately lead to much more outsourcing of application solutions development and maintenance. Many central IS staffs don't have training in distributed processing application development, and the cost of hiring in-house personnel for all the specialty niches required for providing distributed solutions can be prohibitive.

Vendor partnerships should address this market with customizable solutions, based on industry-specific templates that provide reference models for more rapid product development. Strong capabilities in application development tool and systems management products will be basic requirements to compete in such markets. Strong capabilities in re-engineering and process management tools will be important to address the outsourcing of software maintenance.

B
User Expenditures

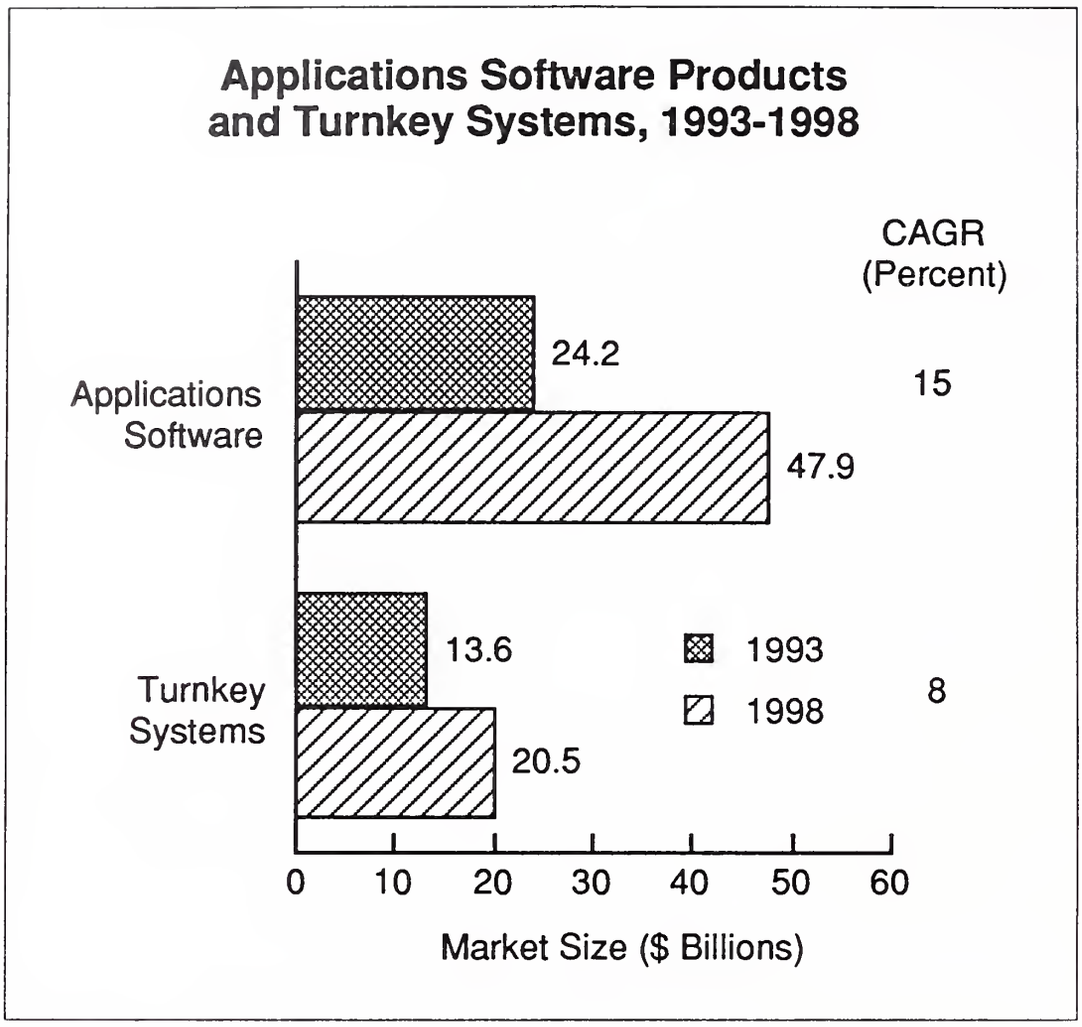
User expenditures for applications solutions are forecast to grow at a 13% compound annual growth rate (CAGR) over the next five years, reaching $68.3 billion in 1998, as shown in Exhibit II-2. This represents a 1% increase from the CAGR in INPUT's 1992 forecast for the applications solutions market.

EXHIBIT II-2



The forecasted growth rate for the turnkey systems market remains at 8%, compounded annually (see Exhibit II-3), whereas the growth rate forecast in the applications software products market segments increased from a 14% CAGR last year to a 15% CAGR in the current forecast. The principal variances in the growth rate projections are in a slightly higher growth rate forecast for PC/Workstation application software products and a slight revision upward in the projection for systems software growth in the turnkey system market segment.

EXHIBIT II-3



A growth impetus for the applications software products market is expected from new client/server applications. However, INPUT believes there will be considerable disparity in the success levels of individual vendors with their client/server products. The ability to migrate a current customer base to the newer product will be particularly important. In addition, future pricing trends for client/server products are still unknown. Pricing should show more strength for products that can truly provide a value-added alternative to existing legacy systems. These represent a second-generation client/server technology, based on a more stable distributed relational database model, and will provide more of a server-to-server based solution. Current generation products, which have a heavy emphasis on front-end, client-based decision support, are expected to exhibit early price erosion.

The two delivery modes, applications software products and turnkey systems, will continue to converge over the next five years. A total solutions marketing approach (large vendors providing bundled "open systems" solutions) will be the most successful for addressing the large in-house corporate application development market. In addition, large vendors can leverage their marketing and support infrastructure by resell-

ing independent software vendor products. Thus, the size connotation of a VAR may change considerably over time, from primarily small to midsized vendors to more of the large computer systems and systems software vendors.

Distributed processing adds to the complexity of the end-user decision process. However, it appears from recent financial reports from companies providing client/server solutions that the market for such products is now moving from an end-user evaluation phase to actual product implementation.

In addition, there is speculation that a number of corporations are developing client/server applications, but for competitive reasons don't want to provide many details on their activities.

C
Vendor Competition

Exhibit II-4 shows that approximately 97% of U.S software vendors produce revenues of less than $20 million (as measured in INPUT's 1990 survey).

EXHIBIT II-4

* U.S. Applications Solutions Vendors, 1992

	Company Size			
Company Type	<$1 - 20M	$20 - 100M	>$100M	Total
Software Vendors	2,900	56	35	2,991
Turnkey Vendors **	2,500	40	16	2,556
Total Industry Service Vendors	11,200	203	113	11,516

* INPUT Estimates

** Potentially excludes several thousand smaller VARs with revenues of less than $250,000

In addition, in recent years industry giants have emerged, changing the software product market considerably. Such market giants have the resources to continually provide new products, and have the financial resources to make strategic acquisitions to further strengthen their market positions. They can also allocate large budgets to advertising, conduct targeted marketing campaigns and offer competitive pricing packages.

Also, larger vendors have the resources to provide support services for increasingly complex client/server, distributed-base products.

Smaller vendors are left to fill niche markets. They must consider strategic alliances to compete with some of the larger providers.

Over the past year, another important competitive factor has become increasingly evident. Financially, 1992-1993 has not been a particularly good year for many applications software companies, particularly in contrast to the stellar financial performances of several systems software product vendors. A distinguishing characteristic of the more successful applications software companies over the past year is their early implementation of a client/server product line extension. Some of these early providers of client/server application software, where revenue impact has become more meaningful, are listed in Exhibit II-5.

EXHIBIT II-5

Early Vendor Adapters of Client/Server Technology

- Microsoft
- Lotus Development
- SAP America
- Ross Systems
- Oracle
- PeopleSoft
- Platinum Software
- Lawson Associates

As the market switches to workstations and client/server architectures, only companies that successfully re-engineer their software or develop or purchase entirely new products in a timely manner will survive. Opportunities still exist for new market entrants where large U.S. vendors and VARS may not be able to make the transition quickly.

All respondents to INPUT's recent applications software products vendor survey indicated an intention to provide client/server products. However, time frames appear to be skewed, with many companies not being able to ship for at least another 16-18 months. Also, more than two-thirds of respondents viewed the shift to the client/server computing paradigm as very positive for their companies over the next five years.

The more successful turnkey systems vendors today are those who have transitioned through the proprietary phase to open systems hardware platforms. For the longer term, turnkey systems vendors will need to focus more on open systems software solutions and professional services.

D
Conclusions and Recommendations

Exhibit II-6 outlines INPUT's conclusions for vendors focused on providing applications solutions.

EXHIBIT II-6

Conclusions

- Downsizing is changing the applications solutions market
- Enterprise computing is the model for the 1990's
- Strategic alliance activity is accelerating
- Product delivery will shift toward more solutions selling
- Application solutions vendors will compete with other service delivery modes
- Market will consolidae (big vendors will keep getting bigger)

Downsizing is changing the applications solutions market: Functions that previously were handled in a host environment are now distributed from host to servers on LANs, with the host serving as a data repository. Most IS decision makers and vendors that INPUT spoke to expect to downsize key applications within the next five years.

Enterprise computing is the model for the 1990s: While mainframe and midrange systems controlled mission-critical applications in the past, the PC was the domain of personal productivity and analysis tools. Today, the trend is toward downsizing host applications and making use of all three of these platforms, using the hardware that is most functional for a particular application. Platforms are linked through networks and data is integrated through database management systems.

Strategic alliance activity is accelerating: INPUT's vendor surveys show acceleration in strategic alliance activity. More recent alliance trends have been with computer systems (equipment) and systems software (application development tool) vendors.

Much of the current strategic alliance activity appears to help accelerate the product development process. In the future, more marketing and product support alliance activity is expected, with many computer systems and systems software companies becoming major participants in the VAR distribution channel.

Vendor consortiums to provide product interoperability are also increasing, and industry consolidation is expected to accelerate with the complexity of client/server product delivery, creating a sharper division between industry success and failure scenarios.

Product delivery will shift toward more solutions selling: The increasing complexity of products creates a product-support nightmare. In the future, users will look more to single-point suppliers of total solutions and support to improve the efficiencies of distributed processing applications. This will require well-defined product and support marketing consortiums that users can look to for long-range product planning and implementation.

Applications solutions vendors will compete with other delivery modes: As software vendors become more service-oriented, it will become increasingly difficult to differentiate software companies from systems integrators and professional services companies. The current principal differences in delivery mode definitions between applications software products, turnkey systems and systems suppliers will also blur over time.

Big vendors will keep getting bigger: In an industry where small companies still are plentiful, certain leaders achieve dominance, which affects the ability of smaller vendors to compete. Growth for larger vendors is achieved through acquisition and market share expansion. Alliances and cross-marketing agreements also increase market penetration for particular vendors. This leaves the smaller vendors to fill niche markets or align themselves with other, more dominant vendors with complementary products.

Recommendations to vendors are listed in Exhibit II-7.

EXHIBIT II-7

Recommendations

- Develop total solutions marketing capabilities through products and services alliances
- Support industry standards as they develop
- Move product orientation to a client/server architecture as early as possible
- Acquire application development tool technology to provide product flexibility

Develop total solutions marketing capabilities through products and services alliances: Vendors should develop a partnership with a vendor of complementary products and services to reduce costs of marketing and support, and also to address the largest available software product opportunity: the current corporate in-house development market. This user community will increasingly require product breadth and flexibility as well as a strong source of product support. A single software vendor will find this an increasingly difficult market to address as an independent, particularly as products require more interoperability or total solutions capability.

Support standards as they develop: In this fast-changing industry, it has been difficult for true standards to be developed. While users and vendors alike have recognized and been moving toward standards and open systems, it has been a slow process complicated by the myriad of new product introductions that have taken place along the way.

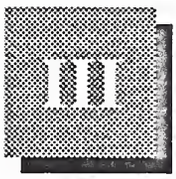
Vendors must be aware of unofficial standards as they develop and be ready to offer products that conform. This becomes increasingly important when providing cost-competitive products to the end-users. Buyers seek solutions that will work on multiple platforms and operating systems. Product standardization will make it easier for buyers to make use of technology as a tool to support their business while being insulated from the technical aspects of computer systems.

In order to support a multivendor and multiplatform strategy, turnkey vendors must either diminish reliance on hardware or support a broad range of hardware platforms. Vendors are under more pressure to open up their systems. Customers may still want a "traditional" turnkey systems solution, but don't want to feel limited to specific hardware.

Move product orientation to a client/server architecture as early as possible: Companies that establish themselves early as providers of quality client/server products will gain the advantage of both incremental market and early strong pricing. Developing partnerships with companies that have strong application development tool technology and distributed processing architectures will provide a sound base for product architecture. Also, conformance to industry's distributed processing standards will encourage early customer product adoption because of the belief that the product will represent a more seasoned (longer-term) solution.

Also, vendors should look to partners for complementary services capabilities in both industry and cross-industry markets as missionary consultants for their products. Particularly, look to companies that are experts in the business re-engineering and business process management areas.

Acquire application development tool technology to provide product flexibility: Object-oriented application development tool capability will become increasingly important for independent software product development. It will lead to shorter product development time, much more effective product interoperability in a distributed environment and lower-cost development over time.



Information Systems Environment

A
Background

Over the past several decades, many changes in information systems paradigms have contributed to a vast expansion in both size of the applications solutions market and number of applications solutions vendors.

In the 1960s, when computing was synonymous with centralized systems based on large, batch-oriented machine processors, the decade was dominated by a few large computer companies. Applications software solutions were provided primarily from internal corporate IS resources or by computer systems vendors, mainly as bundled solutions.

The advent of the minicomputer in the 1970s marked the beginnings of distributed processing, characterized by an expansion in departmental computing. It also led to a significant expansion in the number of computer systems vendors, in that the original minicomputer vendors were not traditional mainframe vendors.

The independent application software products market came into its own in the 1970s. In particular, the IBM Consent Decree accelerated the trend to unbundling computer hardware and software pricing.

The advent of desktop and local-area network computing in the 1980s had a revolutionary impact on the computer industry with the major decrease in computer hardware and software cost. In the 1990s, this continuing trend to downsize IS systems solutions forced traditional IS vendors to make major shifts in product development and distribution to remain competitive.

Some of the major computer systems vendors are still among the largest overall providers of applications software. However, it appears that the large computer systems vendors are changing their strategic approaches to the applications solutions market in reaction to the changing corporate IS paradigm toward computer downsizing and the client/server architecture.

Most of the large equipment vendors appear to be placing more information technology emphasis on enabling software for developing and managing distributed processing, along with an emphasis on complementary services, such as consulting, application development and systems integration. IBM, with the sale of its MRP II manufacturing application to Marcam, appears to be signalling less of an emphasis on internally developed packaged applications software.

These companies are also emphasizing their application development tools as enabling technologies for developing client/server and other forms of distributed processing solutions, which is also beneficial for software vendor partners.

B

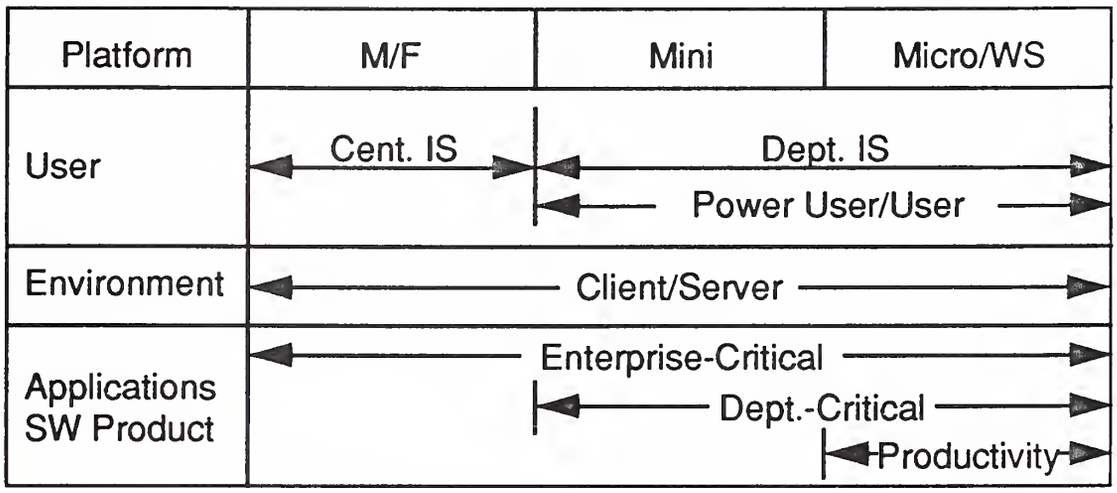
Information Systems Technology Paradigm Shift of the 1990s

The emerging computer systems paradigm of the 1990s is the downsized client/server IS model, which emerged from the networking of desktop computers in the latter half of the 1980s.

As one form of distributed processing, it should ultimately lead to the emergence of the enterprise-wide distributed IS model as the dominant paradigm of the 1990s. As shown in Exhibit III-1, this model will continue to increase end-users' control over corporate computing resources.

EXHIBIT III-1

Information Systems Model for the 1990s



The client/server paradigm shift is in a very early stage of implementation. Although there is no single interpretation of the term, it generally implies the ability of the client/user to directly access computer information resources both vertically and horizontally across multiple corporate computing platforms.

Even though the client/server paradigm shift is very much in its initial stage of implementation, the impact has been evidenced in 1993 in the declining profitability of many vendors of traditional mainframe and minicomputer-based packaged application solutions. In part, this reflects confusion on the part of potential customers about proper strategies for implementing this new information technology model, with the plethora of alternative computer platforms and distributed (client/server) architectural alternatives.

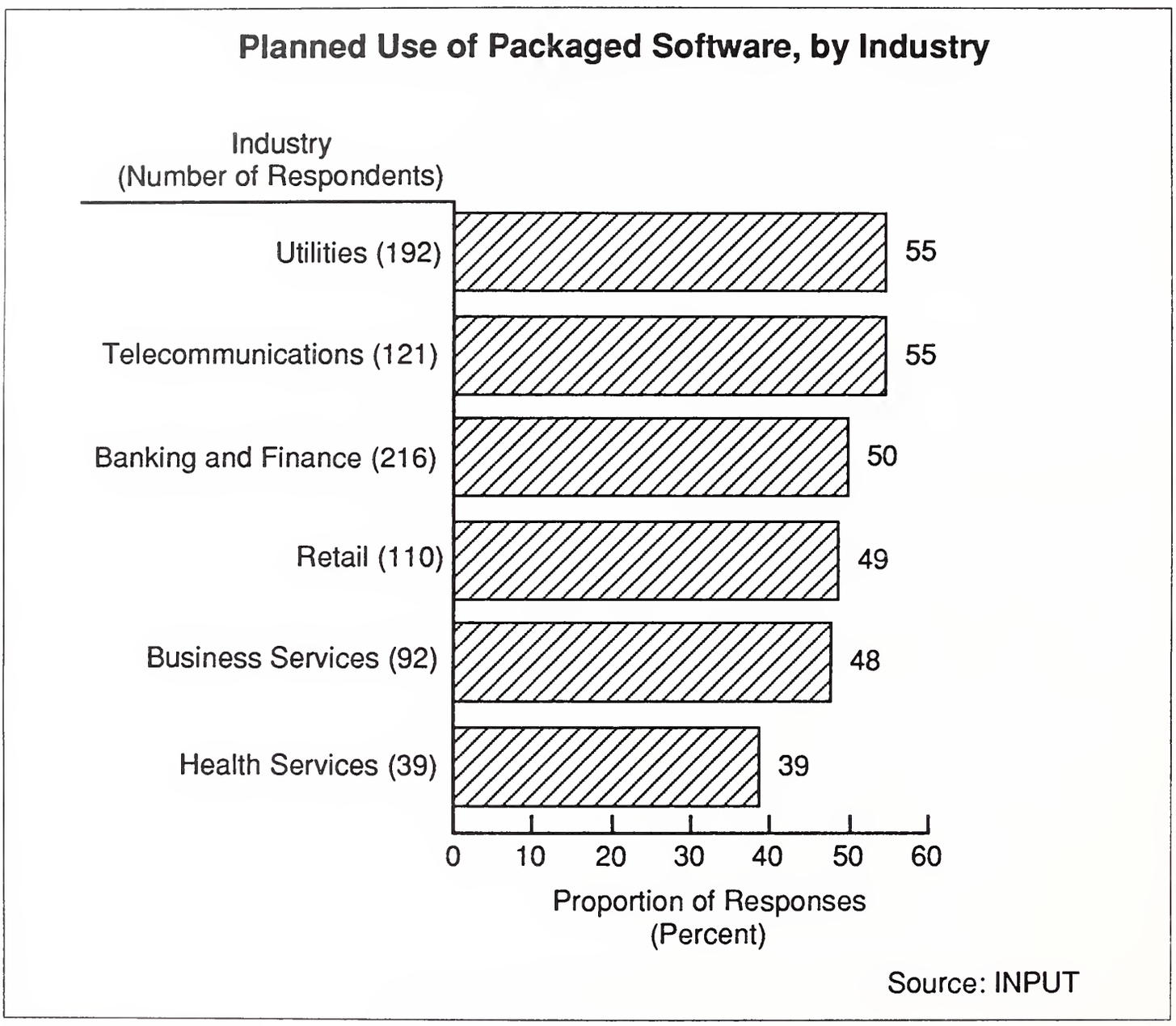
To help determine the current reality of client/server computing in both user and vendor communities, INPUT recently surveyed corporate IS decision makers on planned computer applications. In addition, INPUT recently completed a number of individual studies on industry-specific and cross-industry information technology markets that involved both user and vendor interviews.

1. INPUT's User Survey on Intended (New) IS Applications by Delivery Mode in Industry-Specific Markets

In 1993, INPUT surveyed IS decision makers in more than 1,600 companies about their plans for new computer applications development.

The survey addressed IS decision makers in all leading industry-specific markets. Results indicated that the largest percentage of new software product applications by vertical industry will be in Utilities, Telecommunications, Banking and Finance, Retail Trade and Business Services sectors. Exhibit III-2 shows the top vertical markets for new software product applications, based on user responses.

EXHIBIT III-2



Five principal modes for information technology delivery were measured. These were: systems integration and professional services; packaged software; outsourcing; EDI/Network-based applications; and client/server architectures that cross any number of delivery modes.

More than 50% of all respondents intend to implement a downsizing strategy involving client/server-based technology.

2. Elaboration on Industry-Specific Information Systems Environments

As previously indicated, INPUT also does annual, in-depth studies on the Information Systems (IS) Environments in each of the major industry-specific markets. These studies are based on in-depth interviews with users and vendors in each market sector. Particular Information Systems trends identified are summarized below.

a. Discrete Manufacturing Sector

INPUT's recent surveys indicate that Discrete Manufacturing is an industry sector where client/server architectural implementations show strong momentum.

INPUT's analysis shows that client/server architecture will play a major role in many new Discrete Manufacturing implementations, whether they are upgrades of the existing infrastructure, reorganization of databases or new applications. Exhibit III-3 shows the distribution of target platforms for new applications in Discrete Manufacturing among survey respondents.

EXHIBIT III-3

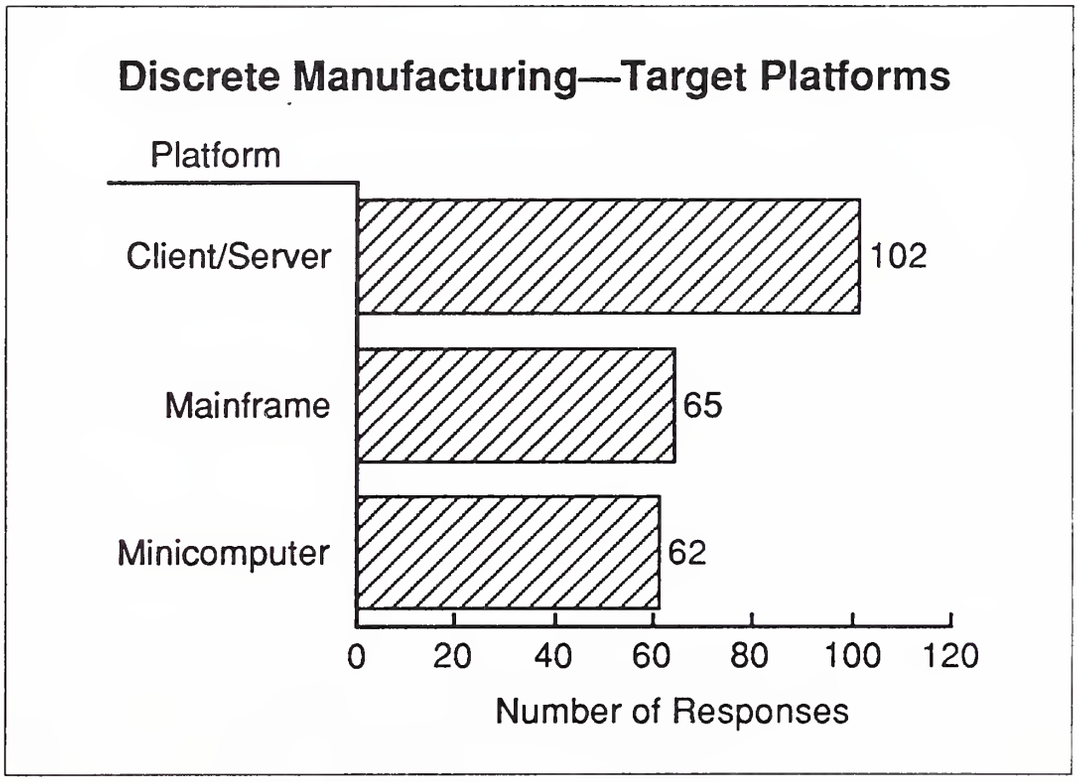
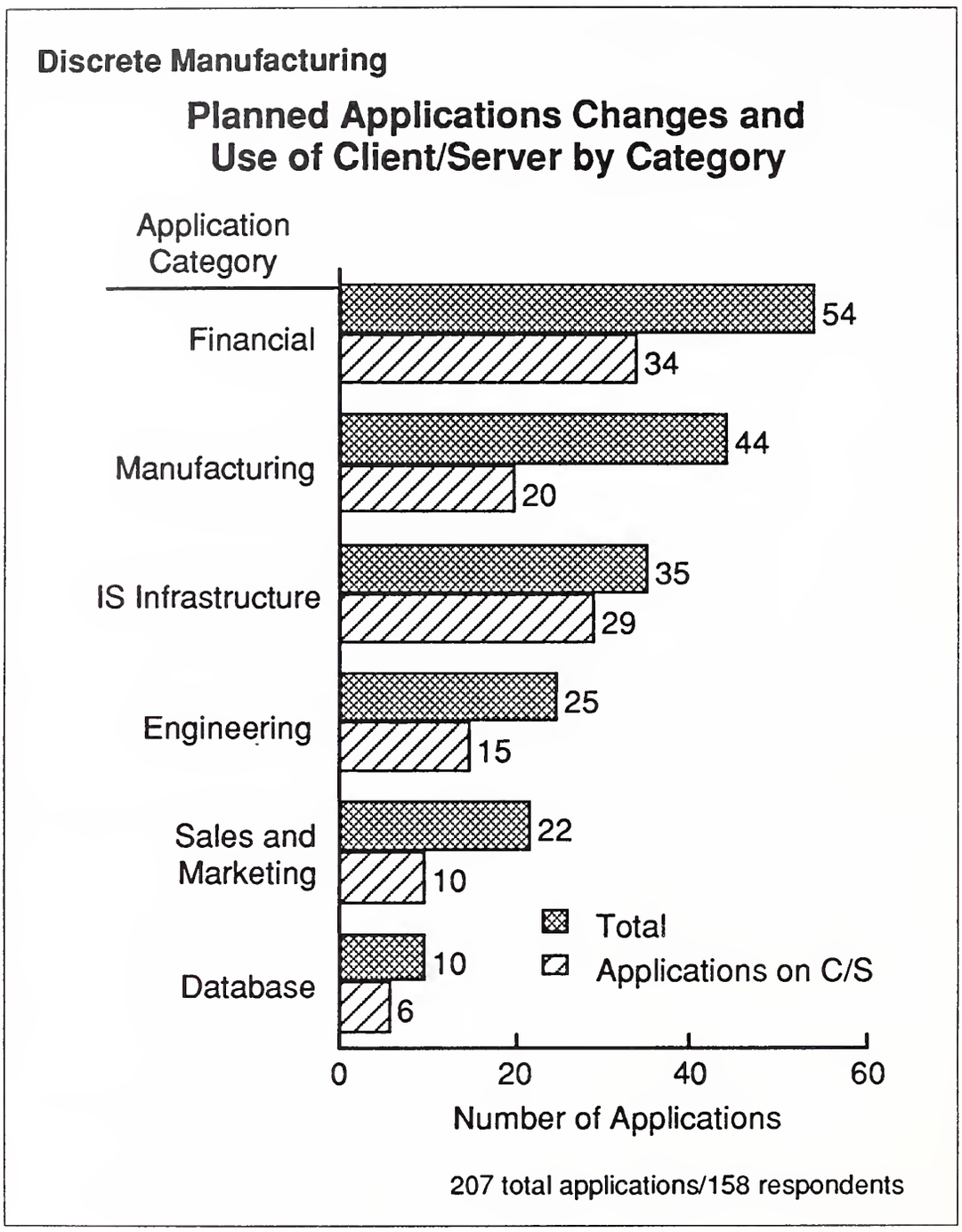


Exhibit III-4 shows the principal categories of planned applications by users surveyed for the discrete manufacturing sector, and the number of applications in each category that will be implemented using a client/server architecture.

EXHIBIT III-7

Discrete Manufacturing



Principal driving forces for client/server-based application solutions in the discrete manufacturing industry are: 1) emphasis on re-engineering and restructuring throughout discrete manufacturing companies; 2) increasing availability of "open systems" platforms, such as UNIX, which facilitate interconnectivity and interoperability; 3) movement toward Total Quality Management (TQM) implementation in the manufacturing environment, which empowers decision making among worker groups; and 4) improvement in programmable logic controllers (PLCs), used to transmit and receive information from shared RDBMSs used for implementing statistical process control (SPC) systems.

b. Process Manufacturing Sector

Re-engineering and restructuring also occurs on a large scale throughout the process manufacturing industry. Some of the key elements of the re-engineering/restructuring process are listed in Exhibit III-5.

EXHIBIT III-5

Process Manufacturing

Elements of Re-engineering

- Team assignments to perform complete operations, typically called "focused cells."
- Worker empowerment, moving decisions to the lowest possible level
- Continuous improvement in terms of:
  - Shortening all cycles in the business operations
  - Work towards achieving 100% acceptable quality in all processes and products
  - 100% customer satisfaction
- Responsiveness to total market and individual customer needs.
- Streamlining to perform only in a company's area of expertise.

This restructuring process is evidenced in the shift away from hierarchical organizational structures toward a distributed, client/server environment with more decision-making responsibilities placed on worker focus cells.

INPUT user survey respondents in the process manufacturing industry indicated that many firms also believe they can regenerate applications portfolios at a reasonable cost through client/server technology.

Regardless of the application category, INPUT's analysis shows that client/server technology will play a role in most new process manufacturing implementations. Close to 30% of respondents mentioned client/server or network systems integration as the most important issue facing their IS departments over the next two to three years.

Among INPUT's survey respondents, 40% of the applications to be developed over the next two or three years will involve a workstation/PC-based platform strategy, as seen in Exhibit III-6.

EXHIBIT III-6

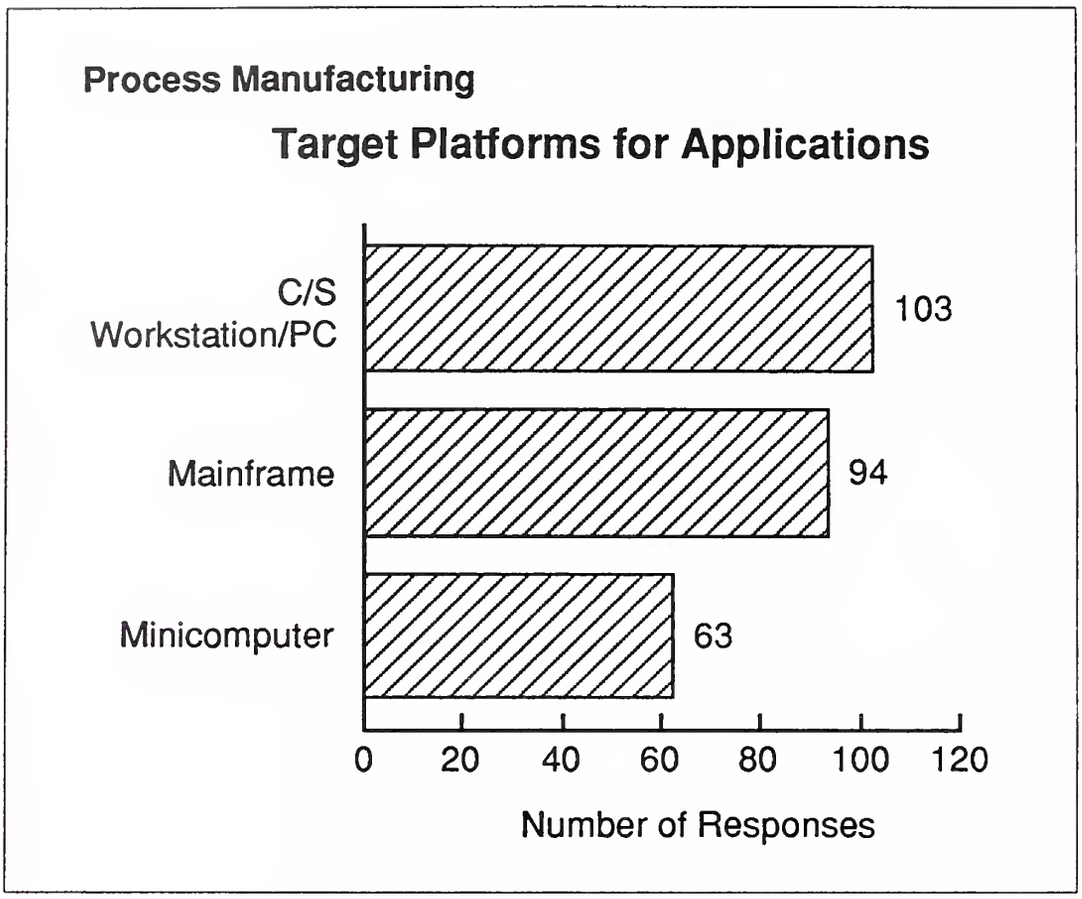
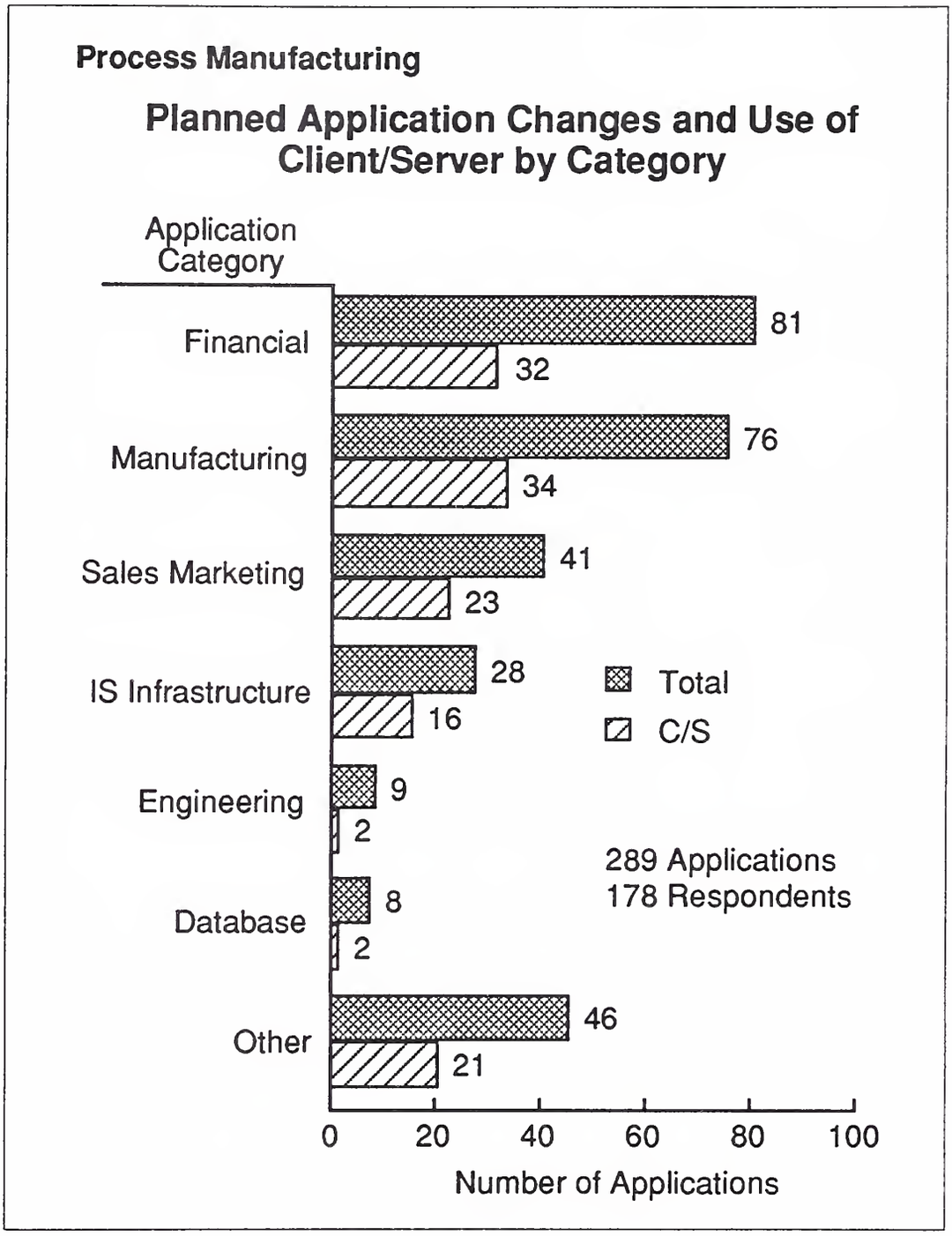


Exhibit III-7 shows the distribution of application categories and the number of process manufacturing applications in each category that will be implemented using client/server architecture.

EXHIBIT III-7



Real benefits to companies from such restructuring are becoming evident. Product life cycles are shortening; order receipt-to-shipping cycles are contracting; cycle reductions and improved quality are leading to higher customer satisfaction.

Most traditional business and planning systems in the process manufacturing industry were "homegrown" because customizable third-party application packages were not available. The situation has changed, and process manufacturers can now take advantage of a number of "customizable" application packages from an increasing number of third-party vendors.

c. Transportation Sector

INPUT's analysis of the transportation market identified several information technologies that are being widely implemented. These technologies are shown in Exhibit III-8.

EXHIBIT III-8

Hot Technologies in the Transportation Industry

- Wireless communications and network support
- Intelligent vehicle highway systems
- Vehicle-mounted computers
- Shipment-scanning devices
- Multimedia

Wireless communication and location systems are the leading new technologies in transportation, particularly in the surface transportation industry subsector. When coupled with digital communications and in-vehicle, real-time computers that provide continuous voice and data communications capability, the application potential is vast.

The larger expenditures over time will be in communications applications software, to make use of this new data flow with the newer telecommunications technology, cellular and other types of radio network transmission.

Increasing cost pressures in the transportation industry cause companies to purchase applications solutions to free their downsized staffs for mission-critical development and maintenance.

Emerging applications areas for railroad and trucking firms relate to real-time data communicated to central operating sites for monitoring equipment performance and rerouting to better use invested resources and improve customer service.

Specific applications include: global positioning systems for vehicle tracking; immediate invoicing and communications with other vehicles for scheduling transfers with wireless communications; and electronic toll payments applications.

Newer airline opportunities involve using expert systems to automate routine but time-consuming tasks like plane loading, crew scheduling and back-office operations. Airlines particularly need cost savings from further automation as they struggle to survive in tough economic times.

d. Utilities Sector

Three principal IS applications segments for the utilities industry are commercial (largely accounting), engineering and operations. Frequently, the formal information systems organization is only responsibile for the commercial applications. Operations and engineering applications are often the responsibility of end-user departments.

During the 1990s, there has been a wholesale integration of utility information systems, not only of commercial systems managed by information systems, but also of engineering and operations applications that are now outside the corporate systems' jurisdiction. A major reason for this is increasing competitiveness within the utilities industry, causing information resources to achieve improvements in the cost structure and customer service.

One of the most important information systems of the utilities industry is the Customer Information System (CIS). The modern CIS is the key information system of the utilities and includes order processing, meter reading, billing, credit and collection, adjustments, cash and customer information.

In larger utilities, the most important characteristic of a CIS is its age. Many of these systems were developed in the early 1970s and are extremely difficult to maintain. The result has been a spurt of activity in rewriting these systems. Almost without exception, these newly initiated rewrites are for an S/370 architecture using DB2 as the DBMS. Cooperative processing is on the leading edge of these rewrites, with some viewing the mainframe as a giant server, as part of a client/server architecture.

Important utilities systems in the 1990s are the Supervisory Control and Data Acquisition (SCADA)/Energy Management Systems (EMSs).

SCADA and the more advanced energy management systems are the backbone of utility operations. These systems monitor and control the utility network in real time. As such, they are responsible for the network's economical and reliable operation. These are sensor-based systems that feed into a controller, either directly or through a hierarchical control arrangement.

Introducing open systems has profoundly affected the SCADA/EMS market in recent years. Virtually all major suppliers in this turnkey market espoused the benefits of distributed, workstation-based architectures. The cost implication of this approach is often to halve the price of prior systems.

UNIX and open systems applications also show increasing popularity in engineering and operations areas of utilities. This is driven by increasing focus on integrating applications and rapid growth of facilities management systems. Virtually all major Automated Mapping/Facilities Management (AM/FM) vendors are on UNIX, and AM/FM decisions may drive the platform for other applications that exploit the AM/FM database.

e. Banking and Finance Sector

Business re-engineering and downsizing are also major themes in the Banking and Finance industries.

Some of the IS strategies pursued by large banks and other financial institutions to contain or reduce costs are listed in Exhibit III-9.

EXHIBIT III-9

Banking and Finance

Cost Reduction Strategies Applied by Financial Institutions to the IS Function

- Reduced product development/customization
- Standardized on fewer application systems
- Reduced maintenance expenditures
- Reduced internal DP staff
- Reduced use of outside consultants
- Consolidated networks and data centers
- Outsourced applications and/or operations

Many banks are stripping away peripheral functions (e.g., data entry, simple queries) from mainframe systems and placing these functions on distributed client/server systems. However, relatively few banks are undertaking the up-front investment to downsize by moving mainframe-based processing systems to networked PCs and workstations.

In addition to the initial investment, a major obstacle to the PC environment is that the kinds of operations now on the mainframe, for most midsized and larger banks, cannot yet be handled effectively on smaller platforms, even with recent advances in processing power.

Current PCs and workstations are not designed to handle the large volume of data (measured in gigabytes) required by large bank operations. Nor do they possess the level of sophistication in operating system and database software required to support complex banking applications. In addition, most high-volume peripherals that are integral to core banking functions (such as check processing systems) are available only for mainframe attachment. A new class of such systems—designed specifically for use with networked PCs and workstations—will be required before downsized systems can supplant mainframes in banks.

Newer technologies that are impacting the way banking and finance firms design and implement their information systems include: RDBMSs (especially IBM's DB/2), Imaging, Expert Systems, EDI, Workstations (particularly for traders in banks and brokerage firms) and CASE and 4GL application development tools.

In addition to small-scale, departmental "file-folder" systems being offered by turnkey systems vendors, most sizable banks are examining several types of imaging systems.

The increasing maturity of three technologies—networking, imaging and client/server computing—is finally leading to rapid growth in distributed departmental "file folder" imaging applications.

The stumbling block for imaging is fixed costs—complete systems range as high as tens of millions of dollars. Today's cost-cutting environment tends not to support such investments without clear proof of short-term payback—which, at this time, is not readily apparent for most large-scale imaging applications.

In the mid-1980s, many observers saw expert systems as a bright new star for banking, especially for credit scoring, loan authorization and credit card charge approvals. Although examples of all such applications exist, there appears to be relatively little enthusiasm among banks for moving further with expert systems.

Although all banks routinely use electronic ACH (Automated Clearing House) facilities and wire transfers, few apparently see themselves in future roles as significant EDI intermediaries.

f. Insurance Sector

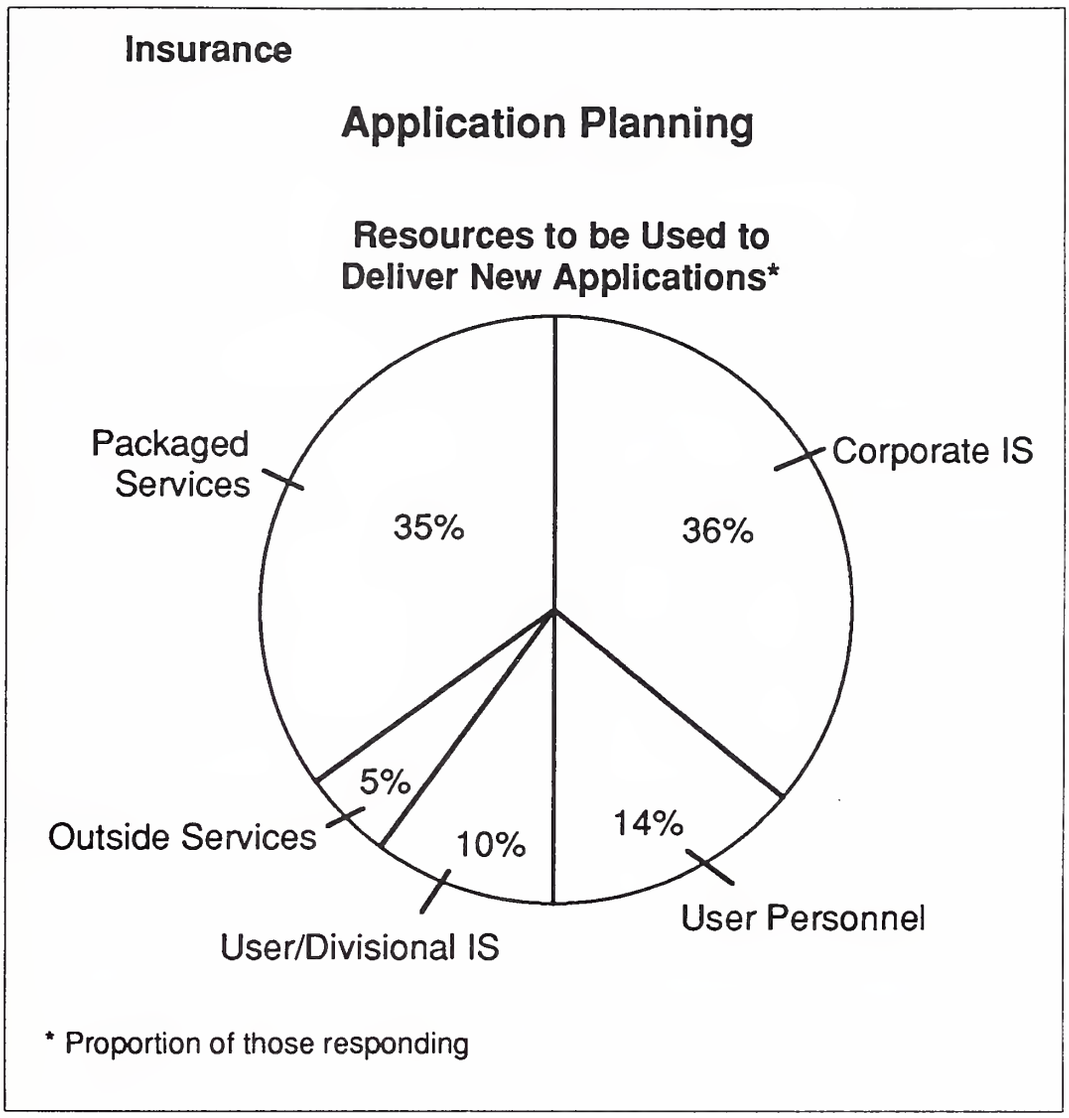
The insurance industry has traditionally supported its systems requirements with centrally managed IS organizations that develop applications solutions in-house for the mainframe environment.

This long-standing tradition is changing. Insurance companies are now more interested in moving information into the hands of the individuals that will be using it, so involving these users in applications planning is becoming more important. In order to make information more available throughout the organization, distributed systems and client/server architectures are being considered.

INPUT interviewed more than 100 insurance companies representing the property/casualty, life and health insurance segments of the industry. Departments making use of technology are increasingly involved in applications decision making.

In addition, packaged software is now a more viable solution to meeting new applications needs. As seen in Exhibit III-10, an equivalent number of respondents indicated using of packaged software for new applications as did those indicating that corporate IS solutions were being used.

EXHIBIT III-10



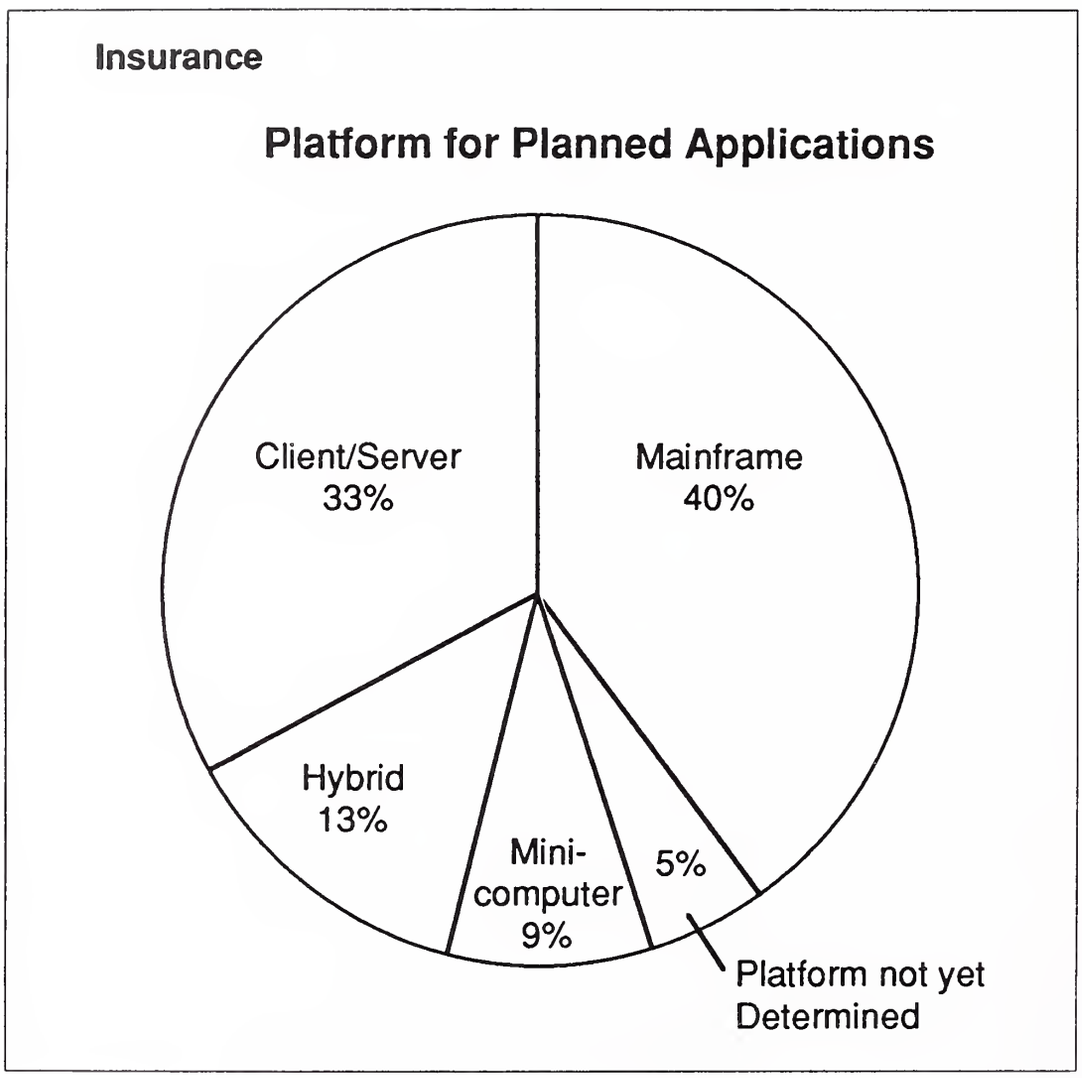
Insurance companies have been streamlining their organizations in response to market conditions. This affected IS organizations within these companies through budget cutbacks and staff reductions.

At the same time, insurance companies see information technology as an important tool for supporting many of their primary business goals, such as reducing cost and improving customer service and targeting efforts.

Many companies INPUT spoke with seem to believe that most of their organizational changes are behind them. A total of 54% indicated they anticipated no changes, while 26% expected changes related to decentralization and implementation of client/server architecture.

Insurance companies are not giving up their mainframes. As shown in Exhibit III-11, INPUT survey respondents indicated that 40% of their planned applications will reside on mainframes. When specifically asked if the applications planned were being downsized, 71% of those surveyed responded "no." At the same time, there is movement toward a client/server environment, where the mainframe will fill the role of data repository or will continue to handle large, traditional applications such as general ledger, accounting and payroll.

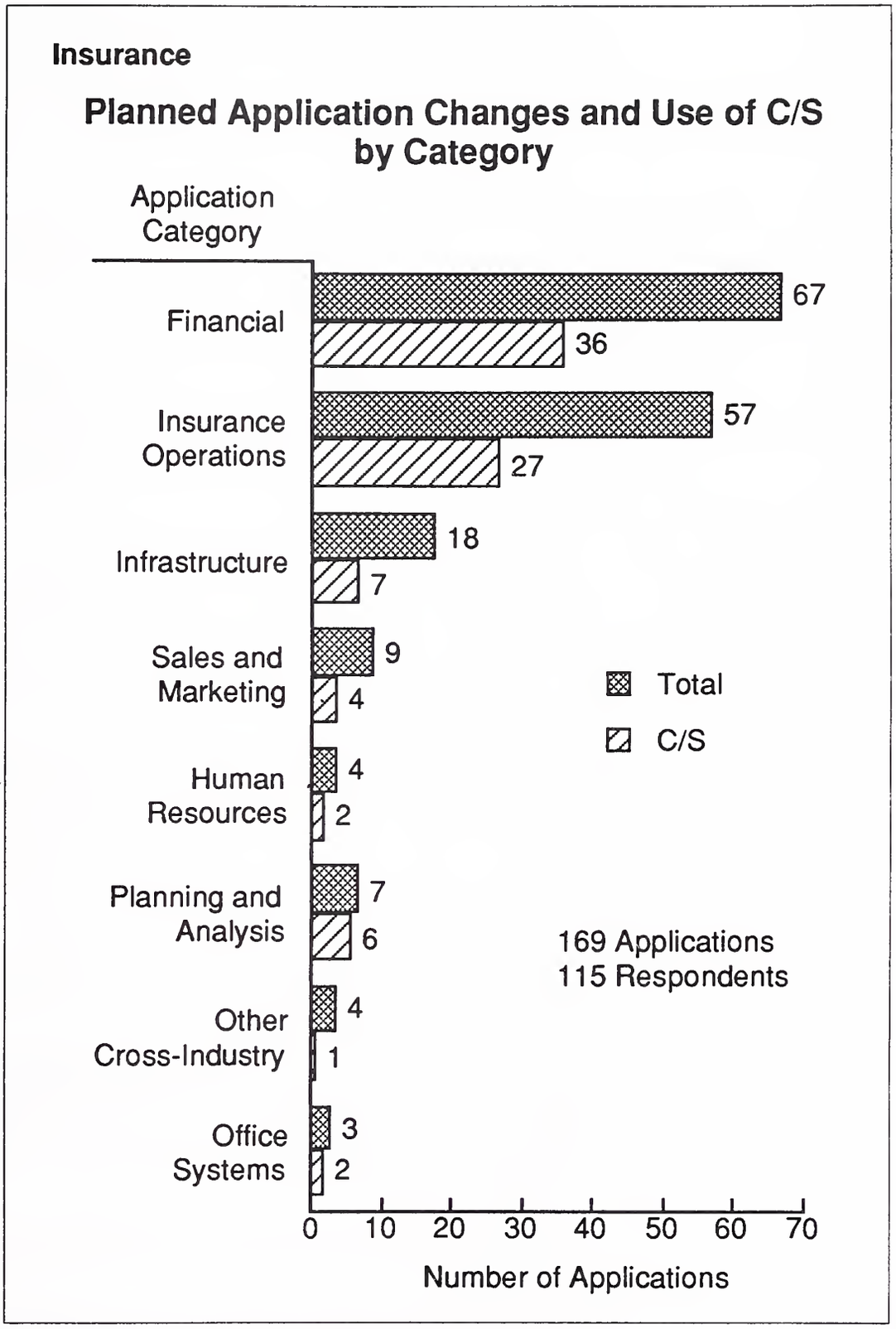
EXHIBIT III-11



The need to bring data closer to the actual user of that information accelerated the growth toward distributed systems and client/server architecture.

Excluding office systems and planning and analysis applications—traditional strongholds for client/server technology—the insurance sector applications with the highest planned client/server implementation rates (according to INPUT's user survey) are financial systems, human resources and insurance operations, as shown in Exhibit III-12.

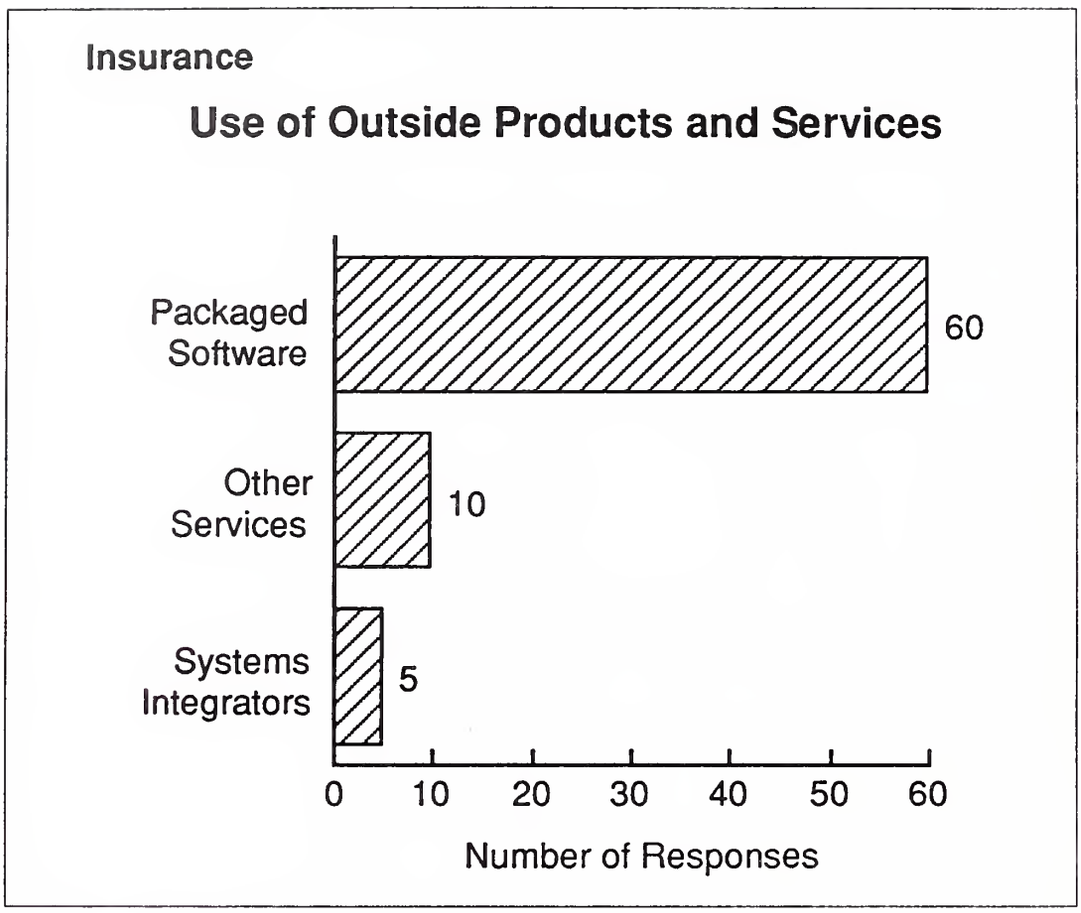
EXHIBIT III-12



Specific applications within these C/S categories that ranked high on the list include: 1) claims loss history and payments; 2) financial reporting; 3) policy processing; 4) agency automation; and 5) customer records.

Exhibit III-13 shows that more than 80% of planned implementations from external vendors over the next two years will use licensed or packaged software.

EXHIBIT III-13



There are only minor variations in the use of third-party software by class of insurer or size of company.

- Middle-sized firms are the largest users of packaged software. The majority of applications using purchased or licensed software will be administrative and staff solutions for which off-the-shelf packages are probably more adaptable than for large firms.

- Accident and health insurance firms are least inclined to use third-party packages.

Some of the more popular information technologies impacting the insurance industry (in addition to client/server) are: 1) imaging processing; 2) EDI for electronic transmission of claims and other medical data; and 3) relational database technology.

g. Retail Distribution Sector

With the unfavorable environment in retail sales and earnings that began in 1989, a number of retailers are looking for IS-type solutions to decrease costs and enhance service.

Major retailers have been early users of newer information technologies, including networking with POS (point-of-sale) registers, bar code technology, open computing systems and on-line databases. This resulted in an IS growth rate for this industry sector, which has been higher than growth rates in most other vertical markets.

Retailers are also impacting information services in other markets, including manufacturing and banking, due to the impact retail has on those sectors.

Retailers indicated that many of their new systems use client/server technology to downsize or re-engineer business systems. A major growth application area continues to be the implementation of electronically captured data from store operations. These often become two-way data delivery systems. For example, POS data is often used to automatically generate orders and deliveries when a store's inventory runs low.

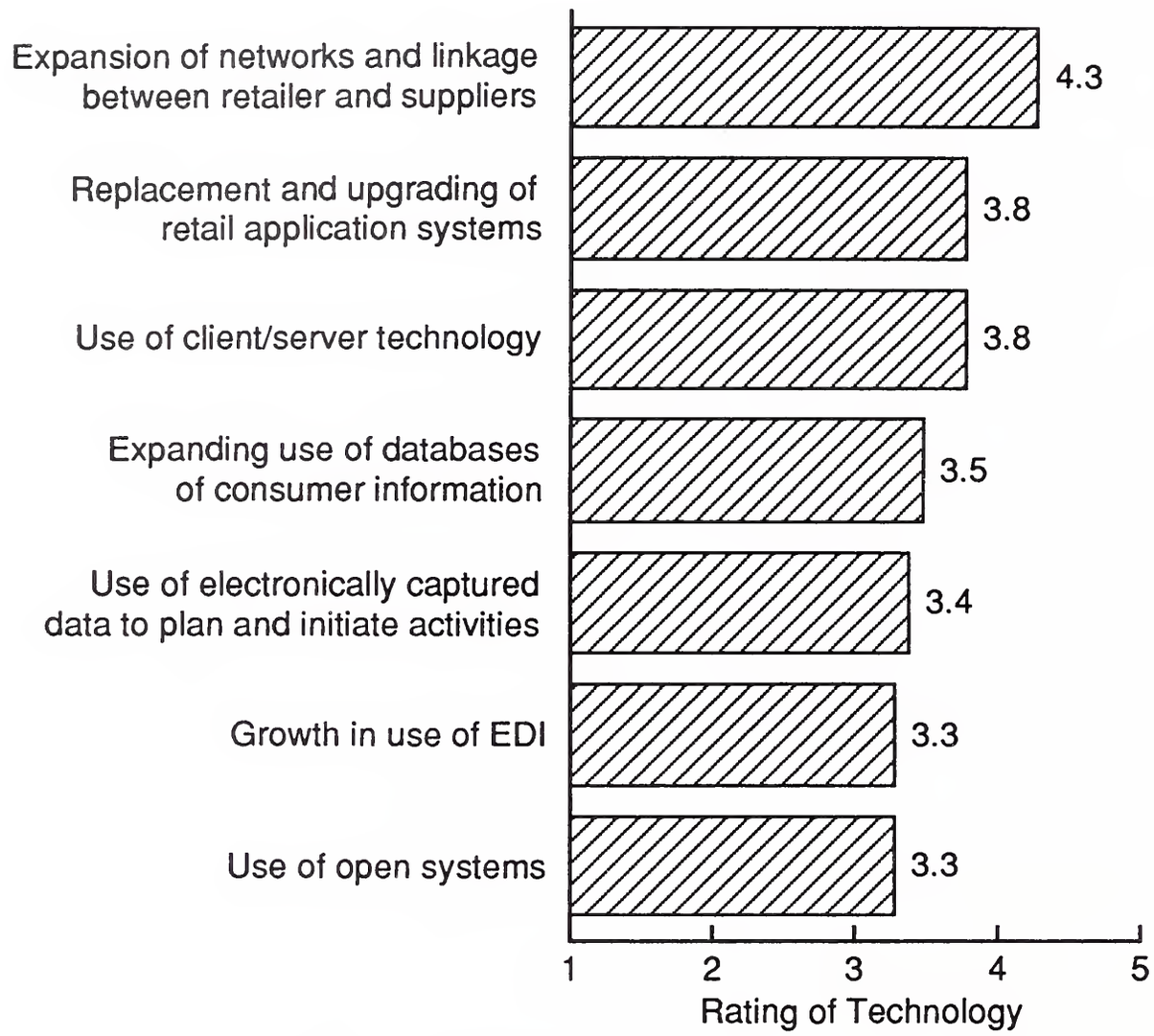
Related to this, electronically captured data provided by power retailers to suppliers and databases supplied by information services vendors such as IRI have become more important in planning for the rapid changes that occur in retail consumption.

Also, electronic data interchange (EDI) in retailing has become an increasingly important application for reducing overall costs and expediting business activity with suppliers.

Major information technology trends in the retail distribution sector are summarized in Exhibit III-14.

EXHIBIT III-14

Key Technology Trends Identified by Vendors and Users of Importance in Retail Distribution



(1 = Low and 5 = High)

h. Telecommunications Sector

The telecommunications industry sector is experiencing a period of major change that significantly impacts both the principal common carrier and broadcast sub-sectors. These groups are positioning themselves to offer many new services, including multimedia, interactive television and wireless services through broadband facilities and high-speed switching networks.

For large carriers, there are frequently at least two information systems organizations: one for developing and managing the carrier's switching system, and the other which is typically responsible for the company's internal support systems.

Deregulation also has a major impact on the level of competition in this industry. Local access carriers (BOCs), bypass carriers and cable TV companies are entering a new period of competition which will require investment in new information technologies to support new services available as a result of deregulation and technological innovation.

Many leading companies are positioning themselves to become providers of much more comprehensive, network-based services, which opens many opportunities for IS vendors.

The primary vendor beneficiaries of these new trends will continue to be the providers of processing services and systems operations.

Common carrier applications traditionally have been developed internally. Systems development staffs at RBOCs and major independents indicate that as much as 90% of their applications result from internal development.

Principal reasons cited for this include:

- On the whole, users believe that their environment is far too complex for packaged applications.
- Few vendors understand the requirements of switching systems. Industry managers believe that the high degree of integration needed between switch systems and support applications systems necessitate a dedicated staff.
- Until deregulation, staff size of the carriers was of limited importance. Because prices were based on the company's cost structure, there was little incentive to reduce overhead costs.

Traditionally, local exchange carriers and smaller independents that operate their own systems have generally been more receptive to packaged solutions than the large carriers. However, large carriers now indicate that the situation has changed since deregulation. Now, with the pressing need to provide a broader base of services in an increasingly competitive environment, they will look more to outside providers for assistance.

Related to this, most large carriers have made substantial IS staff reductions. In addition, the nature of its systems has been changing. Although switching systems remain complex, requiring specialized expertise, there has been growing emphasis on applications that support basic operational systems. The shift toward digital and ATM technology fostered greater ease of integration between switching and control systems and support systems. In addition, the process of developing customer support and sophisticated billing systems requires less industry expertise and more design and development knowledge.

Also, as systems become more complex, there is a requirement for greater knowledge of business applications. Electronic mail (E-mail) and electronic data interchange (EDI) require greater understanding of business telecommunication functions.

Most telecommunications IS managers interviewed indicated that they would acquire application products if they were available. However, they believed that the environment is sufficiently unique that few standardized products are likely to become available.

Exhibit III-15 summarizes the categories of critical future applications over the next several years cited by IS managers with common carriers.

EXHIBIT III-15

Telecommunications

Critical Future Applications

- Service orders
- Flexible billing/EDI
- Facility management
- Electronic imaging
- Network management/outsourcing
- Software-defined networks

i. Federal Government Sector

Pressures to improve operational efficiency and to provide improved delivery of services are leading to an emphasis on business process re-engineering in federal government operations. In turn, this often necessitates changing IT approaches to performing business functions.

The first major evidence of the federal government's direction to improve operational efficiency was found within the DoD, through its Corporate Information Management initiative. The program evaluates functional processes, consolidate operations and implement new work patterns that would result in cost savings necessitated by a declining budget. This practice is still expected to proceed despite the departure of many key officials associated with implementing the CIM initiative.

INPUT's research in 1992 and 1993 indicates that in the civil agencies, business process re-engineering is becoming increasingly evident and is receiving more attention than its earlier touted counterpart, TQM.

Underlying the drive to improve operational efficiency is the pressure to reduce overall operating costs at all levels (personnel, buildings, services, hardware and software). Improvements to information technology are viewed as the chief way agencies can lower much of their operating capital needs.

However, despite initial claims from the Clinton Administration in support of information technology initiatives, uncertainty exists at the practical level regarding actual spending allocations over the next one to two years.

The delay in political appointments at policy level has slowed and in some cases stopped spending on critical IT projects at several agencies.

j. State and Local Government Sector

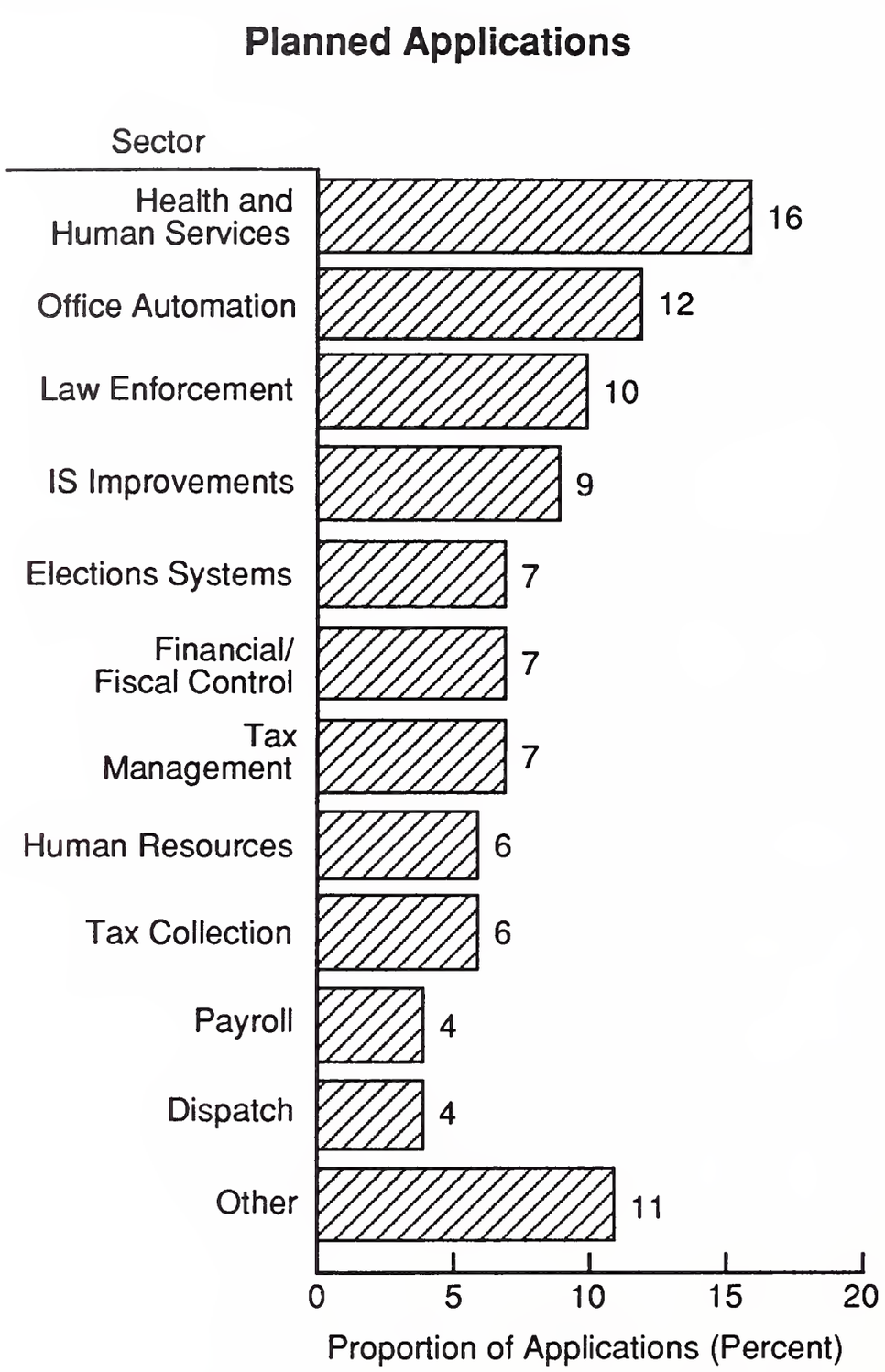
INPUT's surveys of state and local government departments indicate that users are taking increased responsibility for developing their own applications. In addition, budget pressures and staff reductions in IS departments have forced users to look to the outside for help.

Also, both users and IS staff place an increasing importance on emerging standards, particularly for desktop applications.

Exhibit III-16 shows that health and human services applications top the list of planned applications for 1993 and beyond, followed by office automation systems. These applications are driven by the need to meet the demand for increased workloads with fewer staff. The law enforcement applications also reflect the public's demand for improved public order and safety and the budget constraints that prevent hiring more police officers.

EXHIBIT III-16

State and Local Government



Note: Percentages do not add to 100 because of rounding

Improved IS systems are viewed as involving platform downsizing and migration to open systems.

Budget pressures make it difficult to acquire new technology for technology's sake. However, where technology vendors can demonstrate operational improvements, state and local governments are now quick to appreciate the benefits.

INPUT's survey of state and local governments shows IS users planning to acquire new technologies identified in Exhibit III-17.

EXHIBIT III-17

State and Local Government

Plans to Acquire New Technology

- Document imaging
- Office automation
- Local- and wide-area networks
- Client/server systems
- Mobile digital terminals
- Geographic information systems

Many users indicate an intent to integrate many of these technologies: geographic information systems with mobile digital terminals for dispatch, and office automation systems consisting of heterogeneous, interconnected networks and client/server applications.

3. Cross-Industry Information Systems Environments

INPUT also publishes annual reports on the leading cross-industry information technology markets that involve in-depth interviews with users and vendors of products and services in these markets. Particular IS trends identified within the cross-industry market sectors are summarized in this section.

a. Accounting Sector

INPUT estimates that accounting represents at least 20-25% of the total for cross-industry information services expenditures. Because of its relative practical simplicity and pervasiveness, accounting was among the first business functions to be computerized. Until the early 1980s, corporations found it more pragmatically and financially viable to develop their accounting systems on their own.

The so-called "glass house" crumbled early for accounting applications. Since the mid-1980s, it has become prohibitively expensive for companies to develop their own full-fledged accounting solutions in-house. Because this form of development is no longer viable, the issue for companies now is whether to purchase accounting applications that are cross-industrial or industry-specific.

Another key issue for the accounting applications market today is the question of residency. Accounting has traditionally been viewed as the one business application that should remain centralized. As the backbone application in almost any corporate information system, accounting has been considered too important to be migrated to distributed systems, whose trustworthiness has historically been suspect.

However, all this may be changing. Accounting applications powerhouses such as Global Software, Ross Systems, Lawson Associates, J. D. Edwards and Dun & Bradstreet Software Services, Inc. are developing or selling integrated accounting packages based on distributed or client/server architectures. Increasingly, accounting cross-industry users are presented with applications solutions that effectively reduce the complexity of access to accounting information resources.

Although many industry participants are preparing for the demise of mainframe-based accounting, it is too early to categorically dismiss the mainframe as a viable accounting applications platform.

Rather than place all their eggs into one basket, several vendors INPUT interviewed are wisely preparing themselves to place applications on multiple platforms. Many of these implementations represent the first steps toward providing client/server accounting applications.

INPUT's research indicated an increasing interest in UNIX-based accounting applications among users. Over the next two years, industry experts predict that UNIX-based accounting could reach 25-30% of the total cross-industry market.

Because users often consider accounting to be the core of their businesses and because it is such a fundamental and pervasive application, changing an accounting system affects nearly every aspect of a corporation's information infrastructure.

Because accounting forms the core of business methods, it is still more fiscally sound for companies to indulge their mainframe appetites than to create a substantial capital outlay to migrate or downsize. The key to both user and vendor success on this issue is to realize that migration to new accounting applications solutions will be painful and should be approached with well-conceived migration strategies to assure both revenue and benefit growth.

However, the client/server model continues to gain popularity as users increasingly demand relational database architectures and graphical user interface technology to access and manipulate data in a user-friendly, uniform and cost-effective fashion.

Demand in the accounting vertical market should continue, but product and pricing competition, particularly in high-end applications, could prove too difficult for many medium to small-sized vendors. One key area of user demand and vendor opportunity is industry-specific accounting applications. An optimal vendor solution could be to provide customized applications for a number of vertical industries.

b. Human Resources Sector

The human resources/payroll systems marketplace is experiencing rapid technological and structural change.

In addition, continued dramatic changes in the corporate business and government regulatory environments has led to a strong, continuing demand from systems users for more integrated products with greater functionality, flexibility, ease of use and cost benefit. This is particularly true in the human resources benefits administration and reporting areas where much emphasis is placed on the national effort to gain some measure of control over spiraling costs of employee benefits programs. Users of human resources systems have grown substantially more sophisticated in the application of technology to their jobs and demand more and better performance from their systems.

The rapidly evolving marketplace for human resources systems has led to significant changes in the vendor community over the past two years. Significant vendor consolidations have taken place in almost all segments of the human resources marketplace. For large-scale, comprehensive human resources/payroll systems, this consolidation has resulted in fewer primary vendor choices for customers. Client/server, graphical user interface products represent a major product direction for most existing vendors, regardless of whether they are mainframe, midrange or PC-based.

Vendor-provided products are strongly preferred to in-house human resources/payroll system development in most environments.

Re-engineering of the human resources function to increase efficiency and effectiveness of operations with less staff is a popular theme.

Corporate downsizing and restructuring continues to put pressure on human resources departments' ability to deliver services to clients. As companies scale back their middle-management ranks and less staff is available to handle human resources-related matters, more emphasis is placed on automation of human resources recordkeeping and reporting.

The human resources function continues to grow in importance and visibility as corporations struggle to cope successfully with changing workplace demographics, increasing recruitment difficulties for highly skilled workers, work training, productivity and quality improvement efforts and, of particular significance, health care and benefits costs containment.

Key technology trends in the human resources/payroll systems areas are listed in Exhibit III-18. (These trends also cut across other cross-industry and industry-specific market sectors.)

EXHIBIT III-18

Human Resources

Key Technology Trends

- Client/server architecture
- Networking
- Applications integration
- GUI
- Downsizing
- Data base technology
- Open systems/UNIX
- Imaging
- Voice recognition

Client/server architecture is by far the most significant driving force in the human resources (HR) systems marketplace today. Because of its expense and complexity and the need for central MIS involvement, its appeal is strongest to larger, more complex companies with multiple locations.

c. Engineering and Scientific Sector

The engineering and scientific cross-industry market, as defined by INPUT, consists of four applications areas: computer-aided design (CAD) and engineering (CAE); structural analysis; statistics, mathematics and operations research; and Geographic Information Systems (GIS) and mapping.

Traditionally, engineering and scientific programs of any size and complexity require larger processors—usually mainframes. Although complex, sophisticated design and scientific analysis activity is still performed on mainframes and minicomputers; smaller, more contained tasks have been steadily migrating to PCs.

The engineering and scientific operating environment is changing to include more tools and products that are workstation/PC-based. As a result, computer-based engineering and scientific activity is a cost-effective resource available to users at more and lower levels of business activity.

The population growth of workstation/PCs in this business environment has been almost ballistic.

Mainframe population growth is expected to flatten. The growth of minicomputers (generally IBM AS/400s) as platforms for engineering and scientific applications has been relatively stable, and INPUT expects the population of such platforms to also be essentially flat (no growth) over the next five years.

Downsizing and decentralization are also causing more and more companies to push engineering and scientific computing resources, and the responsibility for contracting for information services, further down in the organization—in some cases, directly to the scientist or engineer end-user. The end-users look for cost-effective, reliable, supported, scalable applications that can be easily installed and easily maintained. In many cases, their first consideration is shrink-wrapped PC applications software.

Other significant information systems trends impacting this industry sector include the growing interest in concurrent engineering, which allows a number of engineers to work concurrently on multiple phases of a product's design and engineering. By taking advantage of the new micro-platform 64-bit architecture, multiprocessing systems will be able to cost-effectively perform many CAE applications in tandem rather than as sequential tasks.

Object-oriented database technology is another area that is adding functionality and performance to CAD/CAE applications.

As with CAD/CAE, structural analysis and statistical analysis applications benefit from the advent of more powerful workstation/PCs in the workplace.

An unusual (but significant) trend in statistical analysis is the need to communicate results of the analysis to mathematically unsophisticated managers who make use of the computational or analytical results. Tools such as the graphical user interfaces, graphics and presentation packages that are available with more applications facilitate this process.

The majority of new GIS applications are written for microcomputers, and most offer map-related databases and sophisticated information manipulation and display capabilities.

"Emaps" are a new GIS application area. They are tools that provide enhanced visualization of the interactions between various elements in environment scenarios. Emaps resemble 3-D maps, but their use is dynamic rather than static.

d. Office Systems Sector

INPUT divides the office systems sector into six application areas: integrated office systems, word processing, desktop publishing, electronic publishing, graphics and document imaging software.

Because the majority of office tasks are generic in nature, office systems are almost exclusively purchased from outside vendors rather than developed in-house. Furthermore, INPUT believes that office systems will not become industry-specific. Accessibility to vertical applications software products will be available through, and integrated with, office systems.

Integrated Office Systems (IOSs) integrate the applications that perform common office tasks. Typically these tasks include the following core applications: electronic mail, decision support systems, time management and filing systems. IOSs enable office workers to utilize applications that are resident on a number of hosts or servers, thus creating a corporate communications environment through integrating line-of-business software with personal software productivity tools.

Workflow and groupware products are also included within the IOS definition.

Over the past three years, the office systems sector has been shaped by the increasing level of PC connectivity and local-area network interconnectivity.

As connectivity efficiency and data integrity between LANs and WANs improves, organizations will explore new enterprise-networking solutions. This push toward connectivity resulted in a shortage of software that will support and manage applications across the enterprise and across heterogeneous platform environments.

As the enterprise-wide networking concept continues to replace the individual departmental office concept, office systems vendors are adding functionality to their product suites. Data General, AT&T/NCR and HP, for example, have all modified their IOS products to a client/server framework.

As client/server products gain momentum, relational database management systems (RDBMS) companies are entering the fray. Oracle has its own electronic mail and word processing packages. Applications software products within these environments will not be limited to office products; the IOS will act as the integrating environment. Office systems vendors attempt to meet user demands for integration and enterprise-wide solutions by importing their products to Windows, developing client/server solutions and providing groupware and workflow solutions.

The competitive environment for IOSs will change dramatically as the office systems sector evolves from primarily host-based systems to PC network and client/server solutions that operate under a graphical user interface (GUI), to workflow or groupware software. Alliances and acquisitions will act as strong product development catalysts in the IOS evolution process of incorporating a greater number of users into the environment. Two prominent alliances in the office systems cross-industry sector are IBM/Lotus and Digital Equipment/Microsoft.

As organizations broaden their office environments to encompass multiple offices, additional vendors with innovative approaches to groupware will enter the office systems sector. For example:

- Lotus Notes is gaining widespread recognition as a groupware product.
- WordPerfect Mail provides E-mail, calendaring and scheduling on a corporate-wide basis.
- Digital's TeamLinks provides an environment for desktop integration through conferencing and videotext services across wide-area networks.
- NCR is developing a workflow product that will automate tasks that involve the efforts of a number of people within an organization or a number of resources.

Imaging technology is just beginning to move beyond its embryonic stage, which began in the mid-1980s, and is now at a point in its development and pricing structure where users are seriously considering its capabilities at the desktop level within an organization.

As organizations re-engineer their business processes, INPUT believes that issues pertaining to automating workflow (in an attempt to control office costs) are escalating in importance. Imaging is also a vital component of workflow automation.

The core of the workflow automation philosophy is the concept that the network is the most expedient vehicle for document filing, routing and management. Forms routing is becoming a popular form of workflow automation.

Relationships between imaging and workflow vendors will facilitate tighter interoperability between imaging and workflow technologies.

The increasing interrelationship between innovative data communications technology and changing business practices has a dramatic effect on the office systems cross-industry sector. As a result of these market forces, the office systems sector is increasingly competitive—which ultimate will translate into improved solutions and pricing for the end-user.

Trends and Issues

This chapter discusses the ways in which current trends in information technology affect applications software products and turnkey systems services delivery modes, along with related issues. Section A focuses on trends, Section B discusses the issues and Section C summarizes their impacts.

A

Information Technology Trends

Exhibit IV-1 summarizes major trends that will continue to have a significant impact on the decisions companies will make regarding applications solutions.

EXHIBIT IV-1

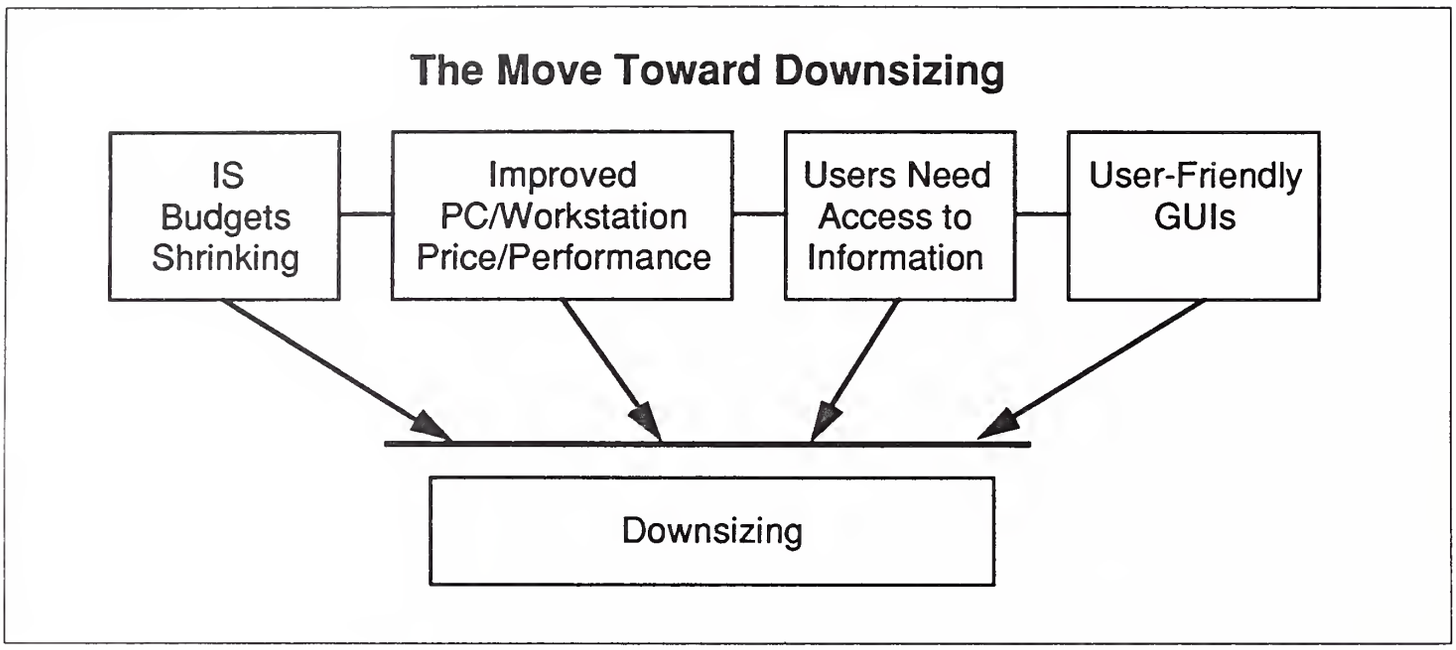
Information Technology Trends

- Downsizing
- Client/server distributed processing architectures
- Increasing impatience of networking/interopability
- Growing importance of the user
- Importance of industry-specific markets
- Process re-engineering/workflow applications and/or re-engineering of business processes
- Artificial intelligence/object-oriented technology
- Outsourcing of application development

1. Downsizing

Several factors are driving companies today toward downsizing, as shown in Exhibit IV-2.

EXHIBIT IV-2



In today's economic climate, companies are under increasing pressure to reduce costs. IS organizations are feeling these pressures acutely.

At the same time, users are becoming more sophisticated in the use of PCs and are requiring greater access to data on corporate systems for analysis and decision support. Many companies view this on-line access to up-to-date information as critical to performing the analyses needed to stay competitive.

The price/performance of PCs and workstations continually improves. In addition, graphical user interfaces such as Windows make it possible for users who traditionally have been "computer illiterate" to use PC/workstations to do their jobs more effectively.

These factors drive the move toward downsizing (also frequently referred to as rightsizing), where applications are moved from large mainframes onto smaller, more easily accessible PCs and minicomputers. More than 50% of the respondents to INPUT's recent research indicated that they expected to downsize and/or move to a more distributed processing environment within the next five years.

A key question arising regarding this trend is, "What types of applications are currently being downsized?" INPUT's recent research indicates that the highest percentage is in accounting and administrative areas, with additional areas of concentration in production processes in manufacturing and client services support.

2. Migration to Client/Server Architecture

The term client/server has often been used interchangeably with downsizing. Like many concepts in their relatively early stages, there has been much confusion regarding what client/server is all about. This confusion is not unlike varying definitions of other generalized IT concepts—such as open systems, downsizing and re-engineering. Vendors use the term in a self-serving way to refer to their existing and planned products. Users reflect what vendors tell them, plus they offer their own unique interpretation of what client/server means.

Client/server is a loosely defined concept that refers to an architecture that divides application logic and processing across multiple computer equipment platforms for the purposes of improving performance, increasing accessibility, reducing costs and leveraging IT investments. Exhibit IV-3 defines key components of client/server architecture.

EXHIBIT IV-3

Client/Server Architecture Components

- Applications software
- Systems software
- Relational database management systems
- Computer/networking equipment

The client/server trend emphasizes a single, consistent architecture across platforms. Much of the client/server software being used today is being developed internally. Software products for the client/server environment are just beginning to be offered. A sales strategy for new client/server vendors is to position their products as scalable across multiple platforms, with relational database management architectures to facilitate data sharing across various hardware platforms and operations systems.

Being able to run the same version of an application on levels of platforms—from a workstation, to a LAN, to a mainframe—is a major selling point when migrating customers to a client/server product because it makes the migration easier. The user sees the same screens, is subject to the same edits, observes the same security, views the same reports, etc., as before.

Many applications developers focus much of their initial efforts on enabling or migrating their legacy applications to operate within a client/server computing environment. While many current development efforts may not strictly fit the definition of cooperative, shared processing, efforts are clearly underway to continually move toward a more distributed computing environment.

a. Client/Server Application Trends

INPUT recently surveyed a number of independent applications software products and turnkey systems vendors on their current and planned client/server product (and services) offerings, as well as their views on the impact of client/server technology on the growth of their company and their industries over the next five years.

i. Applications vendors survey responses on client/server implementation

Seventy percent currently address industry-specific markets (several also provide cross-industry applications solutions).

The principal (historical) development platforms of the respondents have been:

Mainframe	16%
Minicomputer	37%
PC/Workstation	26%
Multiplatform	21%

Approximately two-thirds of the respondents have already shipped at least one client/server product. Nearly all respondents, however, had either announced or were planning to announce client/server-based applications solutions.

The following shows the revenue range represented by the vendor respondents:

$250-$500 million	5%
$50-$250 million	37%
Under $50 million	58%

Revenue growth rates for responding companies in their most recent fiscal years were distributed as follows:

10-15% revenue growth	26%
15-20% revenue growth	32%
20-30% revenue growth	16%
30%+ revenue growth	26%

Current revenue distribution by products and services categories among vendor respondents showed that approximately 44% continued to have a heavy weighting on standard application products.

12% were most heavily dependent on maintenance revenue. These were mainframe-oriented vendors, in more mature cross-industry markets.

Approximately 37% balanced a revenue base across software product, maintenance, customized and complementary services revenues.

Approximately 32% had some product revenue from application development tools; however, the percentages were generally around 5% of total revenues.

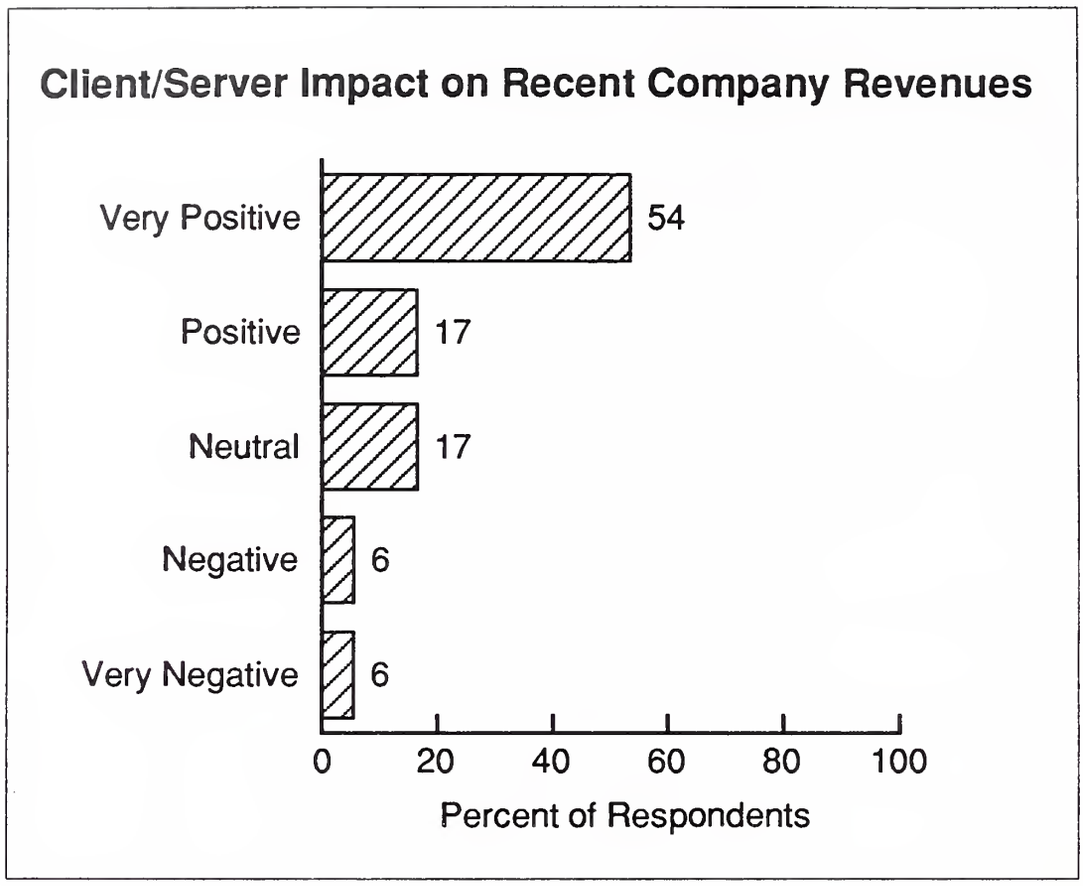
Only 15% experienced any significant revenue shift in recent years toward complementary services (professional services) revenues.

(Percentages of respondents cited above do not total 100% because of multiple responses to questions).

ii. Client/server technology impact on vendor revenues

Vendors assessed the impact to date on their companies from client/server technology. Exhibit IV-4 summarizes their responses.

EXHIBIT IV-4



Nearly all viewed client/server technology as positive because they perceived it as expanding the total available market for their product. It allowed them to sell to a wider size range of companies and to provide additional products for their current customer base.

Over the longer term, many indicated they expect pricing pressures from lower-priced products to have some negative impact. But two-thirds of the respondents thought client/server technology would be very positive for applications software vendors over the next five years, although there will be a skewed distribution of success stories. It was pointed out that vendors must take on more risk, and only very skilled planners and implementers will do well. A higher rate of industry consolidation will be a result, as the less successful are absorbed.

iii. Client/server product impact trends

Current client/server product offerings among responding vendors were in the accounting and human resources cross-industry markets and in decision support, record access (client/patient services) or order entry in such industry-specific markets as manufacturing, health care services and insurance. INPUT projects that the accounting and general administrative

areas will represent some of the larger client/server solutions markets, particularly in the early phases of client/server application development. Manufacturing production solutions should also represent one of the early-stage, large potential markets for client/server applications.

One respondent indicated that the complexity of their current applications is beyond the existing capabilities of client/server technology, and that technology could be used now only in a peripheral way.

Another respondent viewed its client/server product rollout as evolutionary, with a longer-range movement toward an object-oriented product implementation.

Other respondents indicated confusion still exists among potential customers as to what client/server really means. One leading vendor of mainframe software applications noted that many of its customers still viewed client/server applications as putting a "pretty face" on a terminal-based application.

iv. The five-year outlook for client/server technology

Vendor response to the question about how client/server technology would specifically impact their companies over the next five years was generally very favorable.

Particular comments indicated the following assessments:

- The movement to the client/server environment would be favorable, but would develop gradually.
- As a percentage of total revenues, client/server applications would go from 8% of the total in 1991 to a projected 25% in 1993.
- The client/server movement will provide a significant growth opportunity over the next five years (30-50%).
- A mainframe applications software products supplier finds that applications portability from the mainframe to client/server applications is not a significant problem.
- Distributed processing, which is still in its infancy, will eventually represent a general industry shift. However, current issues related to the shift are delaying client services and vendor product development cycles.

- One vendor is not yet seeing much customer demand for client/server products; clients are still in an investigative stage.

- A workstation-based applications vendor sees the impact of client/server technology as very positive in that customers for workstations are more receptive to spending for client/server applications.

- A major turnkey systems vendor sees a major downsizing shift among its customer base from mainframes and minicomputers.

- A leading minicomputer-based firm which is migrating its product over 18 months to support client/server applications, expects to see 100% of its applications be client/server-based in five years.

- An early provider of client/server product extensions to its traditional minicomputer-based applications says 74% of its incremental sales in the last quarter were from client/server-based products.

- Another early provider of client/server applications expects 35-50% growth each year over the next five years, based on the trend to client/server computing.

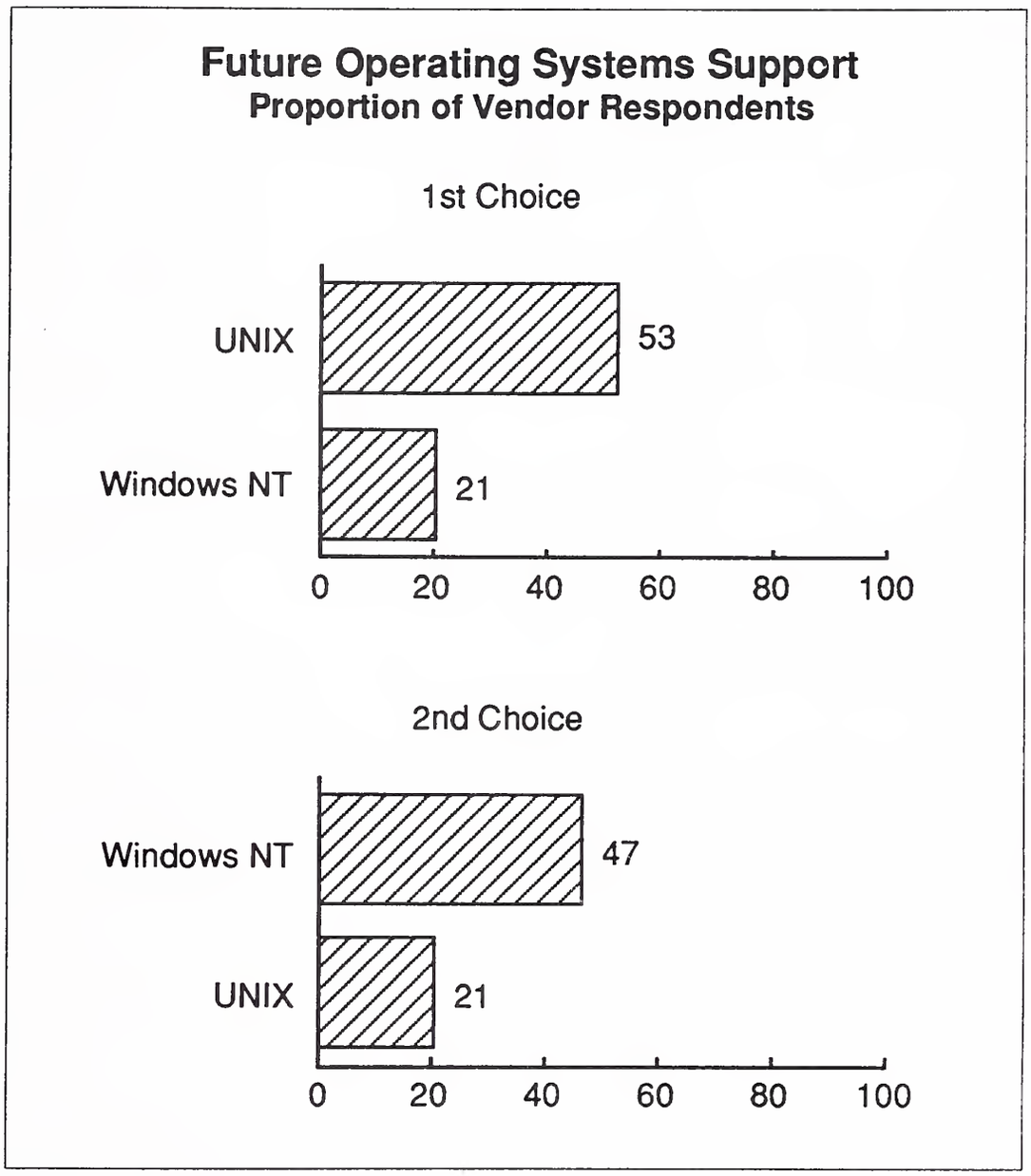
- A vendor who observed great interest in true client/server solutions sees benefits coming from the flexibility provided by RDBMS-based solutions and use of object-oriented technology.

- One vendor indicated they did not see a need for high-end, SQL-based client/server applications, at least not over the next five years.

v. Specific operating systems support for client/server implementation

Vendors were asked what operating systems they considered most important to support for client/server implementation in the future. They were not asked to separate out support by client and server operating systems. Exhibit IV-5 summarizes their responses.

EXHIBIT IV-5



vi. Strategically important de facto/de jure standards

Vendors' preference ratings of important standards to support were quite diffuse. Exhibit IV-6 indicates TCP/IP and Windows as most frequently mentioned. Interesting, the emerging ATM (Asynchronous Transfer Mode) technology was mentioned at both the first and second level of choices by some vendors.

EXHIBIT IV-6

Strategically Important Standards to Support Among Vendor Respondents

1st Choice - Highest level of responses
Windows TCP/IP
2nd Choice - Highest level of Responses
OSF/DCE TCP/IP

vii. Strategic alliance activity

Most vendor respondents indicated a significant amount of strategic alliance activity. A trend could indicate development and/or potential marketing partnerships with computer systems (equipment) and systems software vendors (particularly the leading RDBMS companies).

Specific purposes cited for the strategic alliances included:

- Technology development (with RDBMS companies);
- To bundle specific modular functionality among various partners;
- Product development and co-marketing (with hardware server vendors);
- Alliances with leading systems consulting organizations;
- To develop technology alliances for client/server application tool vendors;
- To support vendor standards consortiums;
- To help provide enterprise-wide computing solutions;
- To provide "whole product delivery" (future alliances);
- To provide alternative distribution channels for particular targeted markets.

viii. Client/server applications solutions over the next five years

Nearly all respondents believed there will be a significant shift to client/server application solutions over the next five years, and most viewed the five-year impact on the applications solutions industry as positive.

One respondent noted, however, that there could be a move back to centralization in the environment of enterprise-wide computing solutions, which will rely heavily on repository-based systems. Centralization will be needed to maintain control of the enterprise. However, clients will also gain access to a much wider range of corporate information resources.

3. Increasing Importance of Networking/Interoperability

The implementation of client/server architecture and distributed processing relies on networking products and services to support communication between various devices. Client/server solutions are not possible without relational-based DBMSs, and LANs and network integration are prerequisites for broad usage of relational and eventually distributed DBMSs.

Companies now find themselves in the position of trying to integrate a variety of platforms and vendor products acquired piecemeal over the years. While IS controlled the mainframe environment, departmental decisions were often made independently, affecting minicomputer and PC selections. In many cases, individual users had the go-ahead to make PC/workstation and related software decisions. Now these organizations want to leverage their existing investments while implementing a unified architecture for computing. Integration of multivendor, multiplatform computing solutions will experience strong growth over the next several years.

4. Growing Importance of the End User

In analyzing IS corporate buying patterns, it is important to ask who is shaping the solutions buying trends, and who is actually buying the software to support these solutions.

The end-user, including individual business unit managers, is exerting much more influence than in recent years on corporate IS buying patterns. Exhibit IV-7 lists several ways this is happening.

EXHIBIT IV-7

User-Driven Environment

- Packaged solutions sought
- Limited internal development resources
- No interest or knowledge of operating systems/networks
- Will seek outside support to modify standard package

The typical end-user is not a "techie," wanting to learn about technology for its own sake. Today's users focus on computing technology as a tool, much like paper and pencil, to address business issues. Business people, for the most part, are no more interested in bits and bytes of computing than they are in the mechanics of manufacturing the paper they use.

As IS organizations become smaller, there will be limited resources to develop in-house solutions. Because the user does not have the skills or the interest to develop applications, off-the-shelf solutions will become increasingly in demand. Users don't want to worry about database management, operating systems, network management or application integrity. What they will generally do is seek help to modify standard software products if packages do not meet specific needs. This need for customization can bode well for turnkey vendors and VARs that bundle additional support with software solutions.

Traditional software products will lose acceptance in this new world if they don't allow easy modification through scalable options, templates and hooks. This applies not only to PCs but also to minicomputers and mainframes.

Although user involvement is increasing, many applications are still within the domain of IS. The stumbling block for vendors here is the long-held belief that many applications, particularly those that are industry-specific, must be developed in-house. Even with increasing development backlogs, lack of programmers and a trend toward outsourcing, many companies still spend more on internal development than on applications software products. Vendors must entice these buyers to consider packaged solutions. One approach by vendors has been to provide not only product flexibility and customization tools, but also services in support of users' unique requirements.

5. Relative Importance of Vertical Markets

INPUT's forecast for Applications Software Products and Turnkey Systems solutions by industry sector points out that several vertical markets are expected to show higher growth rates over the next five years than the cross-industry markets.

Vertical markets forecast to show the highest growth rates are Discrete Manufacturing, Process Manufacturing, Telecommunications, Business Services, Health Services and Insurance. All of these market sectors are expected to show higher growth rates than the individual cross-industry market sectors, except for Planning and Analysis.

Two principal reasons for this are (1) the relative maturity of certain cross-industry markets such as financial management/accounting, and (2) greater availability of third-party solutions for industry-specific market sectors. A positive factor for cross-industry markets will be new market opportunities for migrating legacy implementations to a client/server architecture.

To address the vertical markets, vendors need to draw on expertise of strategic partners who have more in-depth knowledge of particular markets and will need to provide customizable solutions. What will become increasingly important for vendors, to avoid a "customized solutions" support nightmare down the road, is to work with customizable solutions where 80% of the solution is already developed from prior applications experience and only 20% of the remaining solution needs to be truly customized.

As mentioned in a recent systems software report, the Oracle Industries strategic partnership arrangement for addressing industry-specific markets with customized, template-based solutions is a good model. Oracle draws on third-party software product vendors with vertical market expertise and industry clients who could benefit from reselling their in-house solutions.

Eventually, greater use of artificial intelligence and object-oriented programming tools will be required to enable replicating specific solutions for particular vertical markets that can be transferred for solving similar but not identical needs to another customer.

In addition, "plug and play" product interoperability and best-of-breed product integration across vendor partnerships will also enable product development that is competitive with in-house developed solutions.

6. Business Process Management/Workflow Solutions

INPUT believes that another major category of enterprise-wide applications solutions will incorporate process management/workflow capabilities.

Many companies are re-engineering their business processes and as a result, a significant potential market exists for applications that provide business process management enhancement. This is particularly evident in the manufacturing industry.

Business Process Design has become one of the major areas today for enhancing corporate quality and productivity. Essentially the idea is to improve competitiveness by redesigning the company's core business processes.

There are a number of different methodology approaches to business process design, including: 1) The Total Quality Management (TQM) tools 2) the re-engineering approach 3) Artificial Intelligence Modeling and 4) incorporated workflow applications such as image/document management and workgroup applications such as Lotus' Notes. Process redesign also incorporates techniques used in project management but applies them to continuous, ongoing activities.

Also, corporate use of information resource repositories will become more important for business process application development, particularly in providing a vehicle for integrating the information/knowledge base inter-departmentally.

A specific business process design technology impacting the manufacturing industry is known as computer-aided process planning (CAPP). CAPP tools, in particular, could provide the long-needed solution for interfacing computer-aided design (CAD) and computer-aided manufacturing (CAM) applications.

Computer systems and certain software products vendors now provide development tools for their customers to re-engineer business processes and reprogram applications to incorporate business processes/workflow management in formats that reflect the way the user does business. Incorporation of this technology into applications solutions will become very important, especially for companies addressing the client/server and enterprise-wide applications solutions markets.

IBM, for example, emphasizes business process management with the Enterprise Process Management (EPM) facility produced by the IBM Consulting Group. The EPM facility includes a set of client/server tools that facilitate the design and implementation of business process management activities.

7. Artificial Intelligence/Object-Oriented Technology

AI technologies and object-oriented technologies will become more important in implementing workflow/process management solutions. The technology, for example, is incorporated in agents that are used to automatically route workflow/workgroup solutions based on encapsulating existing company workflow practices.

AI could also play an even larger role in Process Planning and Process Management throughout an enterprise. It could be an important tool, for example, for replicating (encapsulating) knowledge gained from process planning and development in one area of a company to another.

Process planning, in particular, is an area requiring a great deal of industry-specific expertise, and knowledge-based development tools that provide reusable components could become increasingly important. Intelligence agents, developed with object-oriented languages, can also be significant to incorporate more detailed processing specifications such as resource scheduling.

8. Outsourcing of Application Development

The growing complexity of application solutions within the distributed processing computing environment will provide a greater opportunity for vendors who can provide efficient application development outsourcing.

Key to success in this area are knowledge of vertical markets, and multiplatform, multi-architecture product knowledge and cross-platform application development tool frameworks (including middleware) that can provide a more cost-effective solution than can be done by internal development resources.

It is also very important to provide a breadth of professional services, including strengths in CASE-based program re-engineering. As part of the outsourcing contract, ongoing maintenance pricing must be based not on traditional fixed-priced, long-term maintenance contracts, but as a professional service—value-added. Because more than 60% of current internal application development work is for program maintenance, this represents a very expensive use of IS internal resources. Vendors with strong, integrated CASE products should garner longer-term maintenance contracts but use value-added pricing based on the benchmark of the company's current internal software maintenance costs.

B

Vendor Issues

As a result of recent trends, applications software vendors need to address a number of new issues in several areas. These are shown in Exhibit IV-8.

EXHIBIT IV-8

Vendor Issues

- Changing market
- Pricing
- Marketing issues
- Alliances
- Open Systems

1. Changing Market

Downsizing and increased involvement of users in purchasing decisions are dramatically changing the application solutions market, as shown in Exhibit IV-9.

EXHIBIT IV-9

Applications Software Product Vendors—Attributes

Attributes	Old	New
Features	Fixed	Constantly adding
Updates	Infrequent	Frequent
Sales	Field	Direct/indirect
Cost of Sales	Labor bias	Advertising bias
Price	$10,000+	$100+
Customers	100s	100,000s

In the old mainframe/IS shop environment, software features tended to be relatively fixed until the next release. In today's world, technology and customer needs change quickly. To be competitive, solutions must be flexible, allowing features to be constantly added. Frequent updates are a fact of life.

When sales were primarily focused on IS, applications software vendors traditionally relied on a field sales force. Software sales were for high-ticket items sold to a relatively limited number of buyers. Today, instead of hundreds of buyers of host software, products are sold to tens of thousands of users with the average price tag at hundreds of dollars rather than thousands of dollars. Clearly, this resulted in a need to change the way applications software is marketed.

Sales strategy should use a variety of channels, including direct and indirect sales, to be cost-effective and reach a broader prospect base. Sales costs have traditionally been labor-intensive, relying on representatives approaching prospects one by one. Today, more dollars are being spent on advertising and promotion.

2. Pricing

Tiered pricing has been the mainstay of IS software purchasing. The larger the system, the more value was gained from it, and software prices increased accordingly with hardware size. Advances in workstation/PC capacity in recent years, along with the proliferation of LANs, have forced applications solutions providers to rethink pricing strategies, some of which are described in Exhibit IV-10.

EXHIBIT IV-10

Pricing Strategies

Pricing	Description
Tiered Pricing	Linked to size of hardware
User-based Pricing	Linked to value for user
Designated User	Each uses assigned software package
Concurrent	Limited to maximum number of users at one time
Metered	Charged by usage
Special deals	Corporate discounts
	Longer term maintenance contracts with special considerations
	Site licenses

As users link their PCs onto LANs, users expect price breaks compared to software on individual PCs. Vendors offer six-pack products for LAN usage; however, in many cases users complain that the savings are insignificant and not enough copies of documentation are provided.

As companies downsize and consolidate data centers, they demand changes from tiered pricing. Some users have been deterred from consolidating applications onto large systems because tiered pricing makes the cost prohibitive. Still other companies complain that they are unwilling to pay the high costs for applications that are not widely used but, due to system upgrades, happen to reside on a mainframe. As costs for hardware go down, users are increasingly unwilling to spend a disproportionate amount on software.

This has led to user-based pricing schemes. One approach is referred to as "designated user," where software purchase/licensing is based on the number of users and each package is designated to a specific user. Another user-based pricing scheme is the concurrent license, where the number of users that can access the software at any one time is limited, but it does not require specific users to be designated.

Vendors also enter into various creative licensing agreements with large corporate customers. These arrangements will often allow unlimited copying within some specific reporting boundaries.

Computer Associates (CA) has developed an enterprise license program that allows the customer to use a program on any computer. Rather than basing fees on the size of the machine, the fee is based on total number of MIPS used by the enterprise. CA also provides credit for the amount of time an application has been on a smaller system and applies that toward the migration of software onto a larger system.

Another approach is usage-based pricing, where the user is charged only when the software is being used. This creates complexities related to monitoring usage that can be difficult to implement. Proginet Corp. has its Software Meter utility, which monitors how often mainframe software is used.

With trends toward downsizing, client/server architecture and shared networks, pricing issues have become more complex. Client expectations are changing, as show in Exhibit IV-11.

EXHIBIT IV-11

Pricing—Customer Expectations

- Bundling—users want it both ways
  - Advantages of bundled pricing
  - Only bundle what user needs
- Client/server pricing
  - Isolated or shared mode
- Pricing options: purchase, lease, usage, bundled, subscription

Users want pricing options to meet various needs. They want the advantages of bundled prices but want to have bundling include only those specific applications needed by the user. A client/server pricing model must be provided. Pricing packages must include a variety of options: purchase, lease and usage-sensitive. Flexibility and responsiveness to user needs will be the keys to successful pricing strategies.

3. Marketing Issues

Given the large number of potential buyers for software, which is continually lowering in price, marketing is becoming more challenging. Vendors must look beyond direct field staff to sell their products to the mass market. They need to rely on a variety of channels—including direct mail, advertising and third-party VAR channels. The large, established vendors clearly have an advantage here, because they have the deep pockets to support such approaches.

Software Suites: Vendors who offer a variety of products leverage their success in one area to gain overall market dominance through the packaging of software suites.

While not all vendors have the option of providing a suite of products, some form comarketing agreements with providers of complementary products.

Software Bundling: Given the competitive software marketplace, vendors are developing a variety of arrangements to increase market penetration. One approach is to arrange with equipment vendors to bundle in software as part of the hardware purchase. This trend is expected to accelerate as one example of new versions of turnkey systems sales by equipment vendors.

These deals can result in software being offered for less than $100 while customers would have to pay $200 through a dealer. While this approach is beneficial in increasing market penetration, it will continue to drive prices down.

Alliances: Alliance activity among vendors is expected to accelerate. Companies are entering into relationships ranging from co-marketing agreements to joint development efforts.

Vendors realize they can't be all things to all people. To keep pace with new technology, they must link up with others who may have complementary marketing and support/service programs as well as software that could be integrated as part of a solution.

4. Open Systems

Users look for software to address their business needs and want those solutions to be available regardless of hardware used. As companies move toward increased use of EDI and other forms of electronic communication, solutions that succeed will be those that are platform-independent. While the move to an open systems environment has not been fully accomplished, software providers need to focus their development efforts on functioning in the open environment of the future.

C
Impact of Issues and Trends

Exhibit IV-12 lists some of the ways these issues and trends affect the Applications Solutions market.

EXHIBIT IV-12

Impact of Issues/Trends

- Client/server technology as a stimulus to application solutions markets
- Software vendors as service providers
- Customization needs
- Need to expand channels of distribution

1. Client/Server Technology as a Stimulus to Applications Solutions Markets

Downsizing and client/server developments will continue double-digit growth for applications solutions. Significant revenue can be gained not only from new applications, but also from upgrades, maintenance and continued licensing of existing systems.

2. Software Solutions Vendor as Service Provider

The software vendor should strive for ways to isolate the buyer from the technology. As discussed, end-users do not want to worry about idiosyncrasies of operating systems, nor do most want to make use of programming tools. As users become more involved in IS decision making, they will look to the vendor more to address issues that they have neither the time nor the inclination to handle themselves.

The vendor needs to change from the role of a product company to a service company, both as a provider to the central IS departments and to the user/business departmental buyers.

Customization capabilities and support will become increasingly important. As such, the lines between systems integrator, consultant and software provider can become blurred.

Likewise, turnkey vendors and VARs must rely more heavily on service content, as well as the added value of their software product offerings, as the demand for increasingly sophisticated software creates a need for customization, training and support.

Every VAR must find more revenues coming from service and software and less from the hardware business. Given the shifting technology foundations, some VARs will opt to exit the turnkey business and sell service only. Many VARs will elect to take more of a systems integrator role.

It will become increasingly difficult to distinguish between VARs and network or systems integrators, which causes channel confusion over the short term. Systems integration work is more of a project-by-project business that requires more flexible pricing and configuration terms than traditional VAR programs.

3. Customization Needs

Chapter III discussed the migration from the traditional IS mainframe environment to client/server and enterprise systems. In the mainframe-dominated world, companies largely developed their own software solutions. When PCs came along, shrink-wrapped software came into its own. Many companies interviewed by INPUT on new applications projects still allocate sizeable funding for internal applications development. However, the majority believe they will purchase more packaged software as an alternative within the next five years. Many stated that cost reductions make maintaining a large in-house programming staff unrealistic.

A discernible shift toward tailoring applications software products by software vendors and third-party server providers, as well as by the customer, is occurring. The ease with which a product can be tailored and the increased availability of tools with which to do this tailoring are compelling selling points. Vendors want to eliminate, as much as possible, the need for hard-code modifications.

4. Need to Target Channels of Distribution

As applications software products and systems vendors introduce new products, and as the cost of direct sales continues to increase, vendors must evaluate alternative distribution channels. Exhibit IV-13 shows current trends in the use of various distribution channels.

EXHIBIT IV-13

Distribution Channels

	Trend	Platforms
Direct Sales	More	PC
Indirect Sales	More	PC, all
Telemarketing	More	PC
Field Sales	Less	Less complex Platforms/solutions
Field Sales	More	Complex solutions/ including consulting and other professional services

Of particular importance will be approaches such as telemarketing, targeted direct mail promotions and increased advertising, along with distribution through traditional dealer channels. The potential number of individual buyers continues to increase, and the expanding small office/ home office market will lead to exponential growth in the number of future buyers. Home entertainment software delivery could also become a very large new delivery channel within a few years. Working with large software publishers might be one way to address this market.

However, competition for dealer shelf space for traditional software sold through this channel will be greater in the future. Vendors need to expand options for distribution.

One of the largest, if not the largest, available applications software products markets is represented by the in-house corporate application development market. The distributed, enterprise-wide applications solutions market could be the most lucrative for third-party providers over the next several years.

INPUT believes that large, full-service vendors will best address this market cost effectively. This includes large computer systems, systems integrators, systems software companies and only the largest of the applications software products vendors. INPUT advises that strategic alliances be established between small and mid-sized applications solutions vendors and these larger, full-service suppliers. In effect, the latter will become the turnkey systems/VAR companies of the second half of the 1990s.

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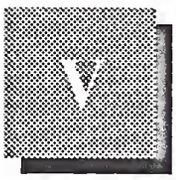


Market Forecast

A
Market Overview

1. Actual 1992 Applications Solutions Market Growth Rates

Exhibit V-1 compares the 1992 forecast figures with the actual market figures for 1992 and also shows the growth rates forecast in both 1992 and 1993.

EXHIBIT V-1

U.S. Applications Solutions Market
1992 Actuals versus Forecast

1992 Actuals and Forecast	1992 Forecast ($ Billions)	1992 Actuals ($ Billions)
• Applications Software	21.1	21.6
- Mainframe	5.2	5.2
- Minicomputer	5.8	5.9
- Workstation/PC	10.0	10.5
• Turnkey Systems	12.5	12.3
- Equipment	5.6	5.5
- Software	4.7	4.6
- Professional Services	2.1	2.2

1992 and 1993 Forecast	1992-1997 CAGR (Percent)	1993-1998 CAGR (Percent)
• Applications Software	14.0	15.0
- Mainframe	7.0	7.0
- Minicomputer	9.0	9.0
- Workstation/PC	19.0	20.0
• Turnkey Systems	8.0	8.0
- Equipment	6.0	5.0
- Software	9.0	10.0
- Professional Services	12.0	13.0

a. Total Applications Solutions Market

The total applications solutions (applications software products/turnkey systems) market in 1992 was $33.9 billion, which reflected a 12% growth rate between 1991 and 1992. The forecasted growth rate was 11%. The primary variant between forecasted and actual growth rate projections was the greater-than-anticipated growth rate in the workstation/PC applications software products market. The higher growth rate in this market submode was due primarily to the unexpectedly high unit growth rate in PC shipments in 1992, with the impact of price elasticity on shipment rates.

b. Applications Software Products Market

INPUT's forecasted expenditures for applications software products as a whole for 1992 were $21.1 billion, representing a growth rate of 11% from 1991. The actual market size was $21.7 billion, reflecting a 14% growth rate. The workstation/PC market, which was the principal submode that accounted for the higher-than-projected overall market growth rate, grew at 22%, compared to INPUT's forecasted 16% growth rate.

The U.S. Software Products Market growth rate came down modestly in recent years from the 16-17% level of approximately five years ago. Principal factors accounting for this appear to be: maturing U.S. software products markets; beginnings of software pricing pressures, particularly within the last year; and weaker U.S. and international economies.

INPUT's previous five-year forecast of 14% for the applications software market was raised slightly to 15%, reflecting primarily slightly higher-than-forecast growth rate assumptions in the workstation/PC market submode.

Exhibit V-2 compares the 1992 forecast for Applications Software with the actual 1992 expenditures by industry-specific and cross-industry market.

EXHIBIT V-2

1992 Actuals versus Forecast
U.S. Applications Software

Sectors	1992 Forecast ($ Millions)	1992 Actuals ($ Millions)
Vertical Sectors		
Discrete Manufacturing	2,224	2,285
Process Manufacturing	683	683
Transportation	431	425
Utilities	225	224
Telecommunications	410	411
Retail Distribution	302	302
Wholesale Distribution	587	585
Banking/Finance	2,120	2,122
Insurance	891	891
Health Services	1,125	1,110
Education	740	745
Business Services	1,017	1,021
Federal Government	790	774
State/Local Government	190	190
Cross-Industry Sectors		
Education/Training	213	221
Office Systems	2,671	2,897
Planning/Analysis	1,894	1,915
Sales/Marketing	360	360
Accounting	2,440	2,666
Engineering & Scientific	727	735
Human Resources	765	763

c. Turnkey Systems Market

INPUT forecasted 1992 turnkey systems market expenditures of $12.5 billion in its 1991 market survey, reflecting an annual growth rate of 9%. Actual 1992 expenditures were $12.3 billion, with an 8% growth rate from 1991. The principal variations between the forecasted and actual growth rates were in the equipment and software submodes, due to the impact of pricing pressures in both areas.

The projected five-year CAGR growth rate for turnkey systems remains at 8%, the same as last year's five-year forecast.

d. Applications Solutions Markets, 1992, Actual versus Forecast, by Industry-Specific and Cross-Industry Markets

For most industry-specific and cross-industry markets, expenditures for both applications software and turnkey systems were in line with expectations, as summarized in Exhibits V-2 and V-3.

Exhibit V-3 compares the 1992 forecast for the Turnkey Systems market with actual 1992 expenditures by industry-specific and cross-industry market.

EXHIBIT V-3

1992 Actuals versus Forecast U.S. Turnkey Systems Market

Sectors	1992 Forecast ($ Millions)	1992 Actuals ($ Millions)
Vertical Sectors		
Discrete Manufacturing	3,097	2,940
Process Manufacturing	614	618
Transportation	302	280
Utilities	104	104
Telecommunications	529	533
Retail Distribution	754	752
Wholesale Distribution	522	517
Banking/Finance	1,010	1,004
Insurance	316	316
Health Services	1,060	975
Education	247	248
Business Services	885	890
Federal Government	1,125	1,115
State/Local Government	195	195
Cross-Industry Sectors		
Education/Training	120	125
Office Systems	120	117
Sales/Marketing	297	302
Accounting	450	500
Engineering & Scientific	129	130
Human Resources	85	83

i. Applications Software Products Markets, 1992, Actual versus Forecast

Principal variants in the Applications Software Products markets were in office systems (+8% variance) and accounting cross-industry markets (+9% variance). See Exhibit V-4. Companies in these two markets are among early providers of higher growth client server products. Additionally, office systems markets have benefitted from sharp price reduction in

workstation/PC products in 1992, which greatly expanded the unit growth rate for these platforms as well, fueling the related market for product release upgrades. The growth rate for product release upgrades, which probably was an anomaly, is expected to moderate somewhat over the next few years, following the initial wave of upgrades to the new GUI (Graphical User Interface) software product for the office environment.

EXHIBIT V-4

CAGR 1992 Report versus 1993 Report Applications Software

Sectors	Projected CAGR 1992-1997 (Percent)	Projected CAGR 1993-1998 (Percent)
Vertical Sectors		
Discrete Manufacturing	15	22
Process Manufacturing	15	17
Transportation	12	14
Utilities	13	13
Telecommunications	20	20
Retail Distribution	13	13
Wholesale Distribution	13	14
Banking/Finance	10	10
Insurance	15	15
Health Services	17	15
Education	11	12
Business Service	15	19
Federal Government	11	4
State/Local Government	13	12
Cross-Industry Sectors		
Education/Training	9	10
Office Systems	15	11
Planning/Analysis	17	18
Sales/Marketing	12	11
Accounting	11	14
Engineering & Scientific	12	12
Human Resources	13	14

The accounting software products market is expected to grow in line with the average applications software product growth rate, as a continuing early beneficiary of the move to the client/server computing environment.

ii. Turnkey System Products Markets, 1992, Actual versus Forecast

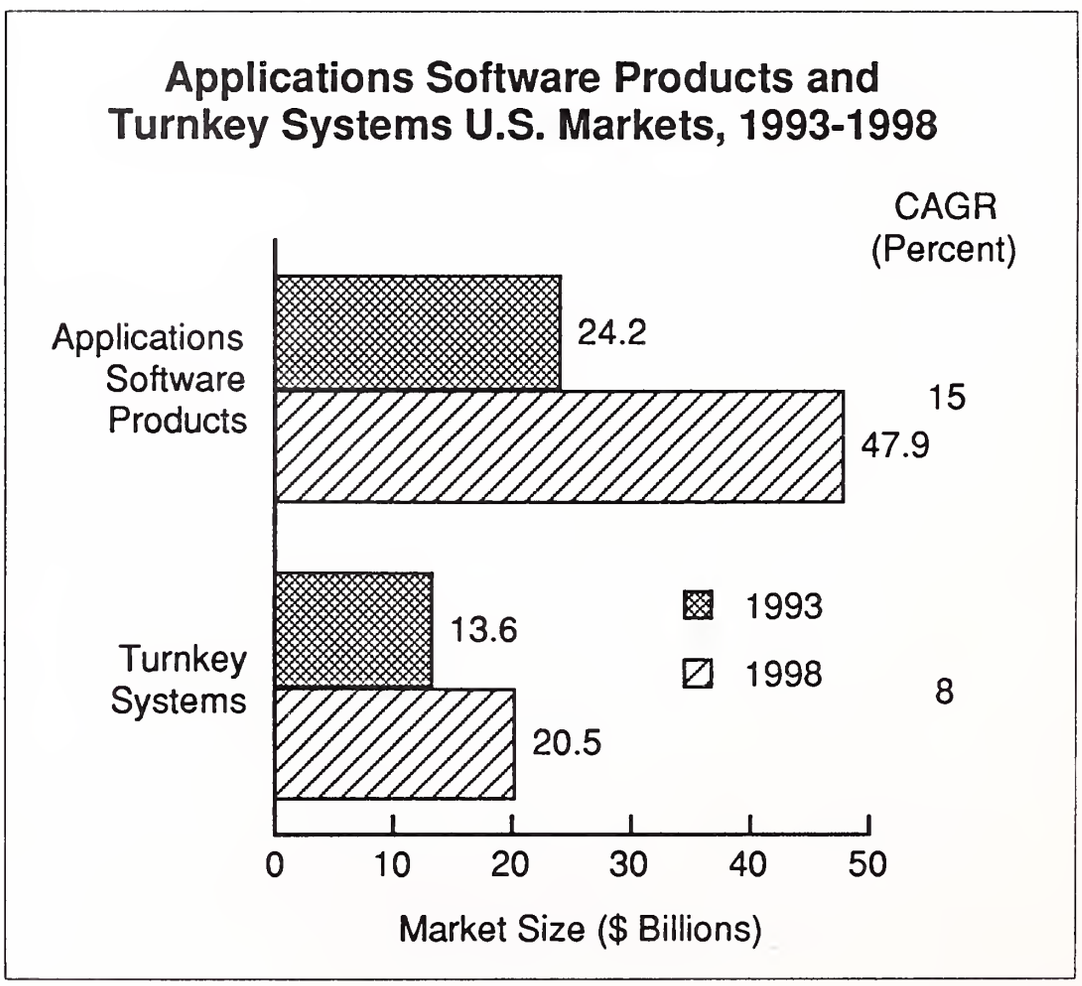
Principal variances between forecasts and actual 1992 expenditures in the turnkey systems markets were in accounting (+11% variance) and health services (-8% variance). The health care market variance reflects purchasing delays based on uncertainty among clients about the type of product that will be needed under health care reform.

2. Applications Solutions Markets, Five-Year Forecasts

a. Application Software Products and Turnkey Systems Five-Year Forecasts

INPUT's forecasted five-year growth rate in 1993 for the overall applications solutions market remains unchanged from 1992, at 12%. Exhibit V-5 shows the five-year forecasts for Applications Software and Turnkey Systems.

EXHIBIT V-5



The Turnkey Systems five-year forecast remains at 8%; the five-year outlook for the applications software products market is slightly more positive, with a 15% projected five-year CAGR compared to a 14% five-year CAGR forecast last year.

On balance, INPUT projects that the shift to the client/server, enterprise-wide computing environment will initially have a slightly positive impact on applications software product vendors. Much of the increase is expected to come from large corporations' use of more third-party application software solutions with the increasing complexity of the client/server application development process.

b. Applications Solutions Market Forecasts by Industry-Specific and Cross-Industry Computer Platform Submodes

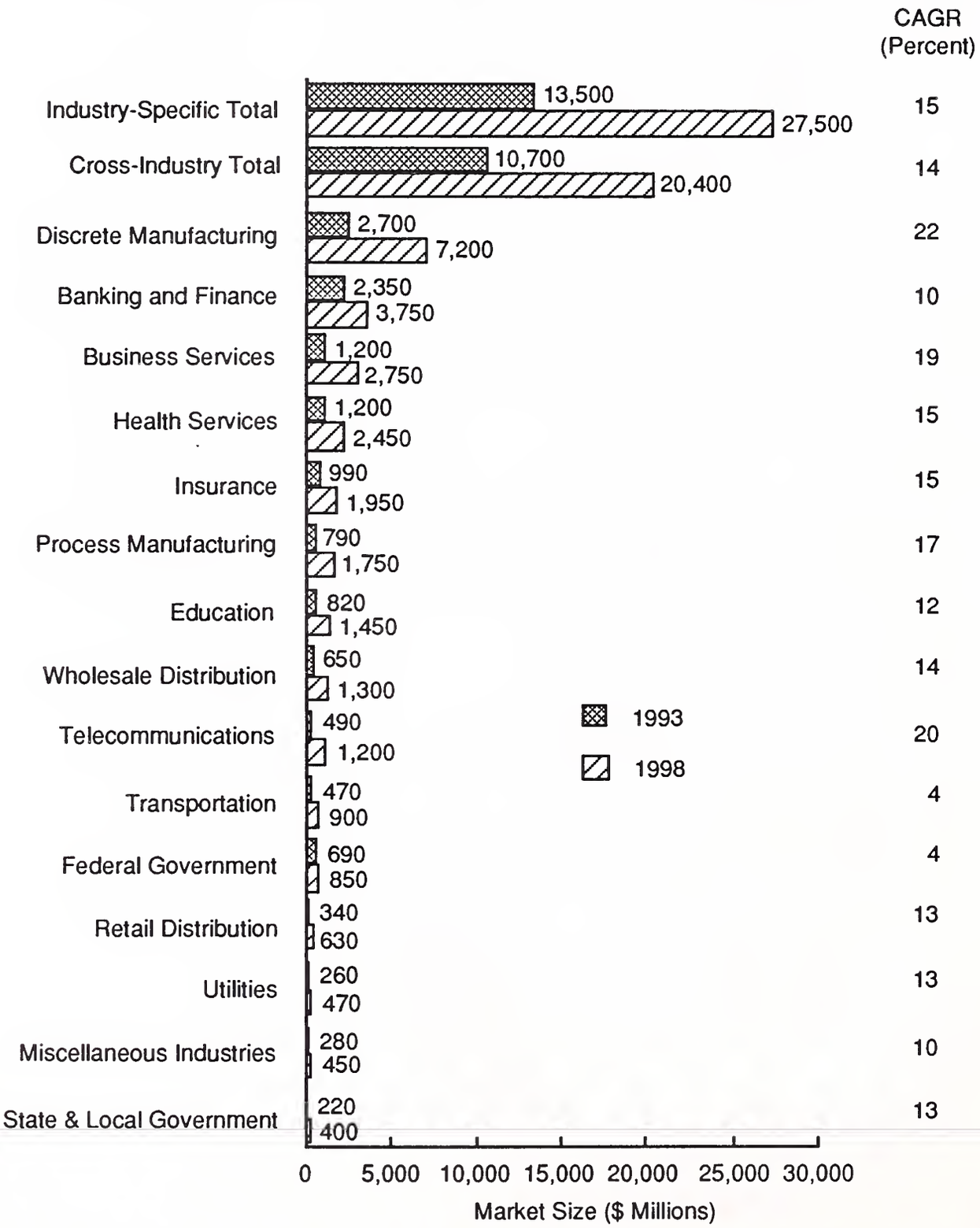
The following comments on the outlook for each of the Applications Solutions Markets subdivisions are based on user and vendor research conducted in 1993 by INPUT's consultants in these industry and cross-industry market sectors.

i. Applications software products—industry-specific and cross-industry market forecasts

Industry-specific software represented 56% of the applications software market in 1992. This is similar to 1991, and is expected to remain approximately the same throughout the next five-year period. Growth rates are projected to be slightly higher for industry-specific markets (Exhibit V-6) at a 15% CAGR than for the cross-industry markets, which are forecast at a 14% CAGR.

EXHIBIT V-6

Overview
Applications Software Products
U.S. Information Services Market by Industry Sector, 1993-1998



Cross-industry applications have the advantage of a wide-ranging customer base with requirements that more easily lend themselves to packaged solutions than some industry-specific areas. The larger market is offset, however, by a lower average price tag than in industry-specific areas. Vendors need to sell more to make more, requiring mass marketing techniques and a variety of distribution channels. Some segments of this market have become more mature, resulting in slower growth in these segments.

In particular, vendors of cross-industry applications should begin to tailor their solutions with industry-specific extensions. As a new channel of distribution, they could partner more with vertical industry vendor specialists or with computer systems vendors who are addressing particular industry-specific solutions markets. In addition to customized product extensions, consulting services might be considered. The intent would be to capture more of the current in-house application development market.

Also, client/server product extensions and support for additional platforms (GUI-based clients/UNIX variations for the enterprise servers) should be developed as soon as possible. This could include, for example, Executive Information Systems (EIS) client/server implementations for accounting applications.

The use of 4GL application development tools will reduce application development complexity by providing a more functional, less standardized product.

Industry-specific vendors should also stress client/server product additions along with the expansion, at least initially, in the number of platforms supported (until more of a consensus on standards emerges).

The major market opportunity for industry-specific vendors is the in-house development market. INPUT estimates that at least 75% of the available software development market is in the in-house markets that required customized solutions. However, with the increasing complexity of client/server, enterprise-wide solutions, outside vendors should have an opportunity to expand their market share into these markets, particularly if they possess a solid framework of application development (4GL, CASE, Object-Oriented) tool capabilities. Also, partnering with systems software and computer systems vendors is recommended to reduce marketing and support costs. In a rapidly changing product development market, this allows the independent vendors to retain the necessary financial resources to remain competitive.

INPUT also believes that as corporations elect to use "packaged" software more in the future, as an alternative to in-house development, the potential market for industry-specific software is significant.

ii. Industry-specific applications software products market outlook

The largest and fastest-growing markets for industry-specific applications software products are listed in Exhibit V-7.

EXHIBIT V-7

Applications Software Products Market Industry-Specific Software

Largest 1992	($ Millions)	Fastest Growing	CAGR (Percent)
Discrete Manufacturing	2,300	Discrete Manufacturing	22
Banking/Finance	2,100	Telecommunications	20
Health Services	1,100	Business Services	19
Business Services	1,000	Process Manufacturing	17
Insurance	900	Insurance	15
		Health Services	15

Discrete Manufacturing is the largest industry-specific market and is expected to continue to lead the industry over the next several years.

In discrete manufacturing, predictions of the total demise of the mainframe business are premature. Mainframes will still perform many application functions in multiplant environments. They will also be used as superservers in the client/server environments and as network mangers. Many applications planned for migration from mainframes will remain until total conversions are completed, causing continuing payment of software maintenance charges. A 5% annual growth rate in mainframe applications software is projected over the next five years.

Minicomputer applications will grow at 11% through 1998. The functionality of these systems has reached a level that gives comfort to buyers. Those who use minicomputer applications are not under the same "downsizing" pressures as mainframe users.

Explosive compounded annual growth of 35% is forecast for workstation/PC applications software over the next five years. At $750 million in 1992, this will yield a market of $4.5 billion—the largest subsegment of any delivery mode.

Driving workstation/PCs in the discrete manufacturing environment is not only their proven function in decision support for staff-level employees in departments such as accounting, but also what will become their increasing importance in the CIM (Computer Integrated Manufacturing) process. Recent progress in concurrent engineering solutions and RDBMS applications allow more OLTP (On-Line Transaction Processing) solutions on the factory floor. This also promotes a closer integration with MRPII applications. As such, many early, successful enterprise-wide applications may be in the discrete manufacturing industry.

Thus, discrete manufacturing is also projected to show the fastest CAGR, 22%, over the next five years for any of the applications software products markets.

The second largest applications software market is *Banking and Finance*. However, is it not projected to be one of the faster-growing markets over the next five years.

The banking and finance industry has made substantial use of packaged software products, particularly among the high proportion of small and midsized institutions. The largest firms have developed the bulk of their own software systems. Many standard packages are offered, although these often require modification to meet a particular bank's needs. Application software customization has occurred in two ways, with no particular pattern except size of institution: smaller firms generally contract to the vendor or a third-party consultant, and larger firms use their in-house information systems staff.

To date, PC-based banking software products (except for spreadsheet-type utilities) are generally restricted to specific departmental applications. There are few PC-based software systems robust enough to meet the high-volume transaction needs of more central banking functions. Mainframes and minicomputers remain the rule for integrated core systems, although this rule may change with advances in power and sophistication of PC-based operating systems and databases.

Mergers and acquisitions in the financial services industry are significantly impacting software markets. In general, acquiring banks do not purchase new applications software as part of a merger. Instead, they usually merge operations of the two institutions into one platform, using

existing software packages. As a result, existing software licenses are cancelled. Attempts by software vendors to stop acquirers from using existing software to process multiple institutions' work after an acquisition have generated such negative publicity and resentment in the industry that the whole pricing structure has come under fire. As a result, even existing licenses are starting to bring in less revenue, and software pricing has become much more competitive. These two factors—reduction in outstanding licenses and more competitive pricing—will modulate growth of software vendor revenues.

In the short term, bankers increasingly will try to make do with existing systems, except where competitive pressures—such as RDBMS-based support of relationship banking—require new software investments. Over the next few years, advances in PC power—CPUs, disk drives, operating systems, data bases and high-transaction-rate peripherals—will lead to a new generation of PC-based software applications that will continue the steady workstation/PC applications software growth, while mainframe and minicomputer expenditures will diminish slightly.

Health Services, the third largest industry-specific applications software product market, is also one of the top five fastest-growing markets.

For several years medical application software products vendors have enjoyed the benefits of industry conditions that favored their products. Of primary importance, hospitals that used outside processing services systems increasingly transitioned to cost-effective, in-house systems. As important, the industry has been caught up in changes wrought by the transition to managed care reimbursement procedures—changes which often include new systems or system upgrade requirements. Furthermore, as a rule, most medical institutions still lack a strong tradition of in-house software development, and many seem largely uninterested in strengthening such capabilities.

As a result, the last few years have seen steady 13%-14% annual growth rates in the market for medical application software. Once the shape of federal health care reform is clear, this growth is expected to strengthen substantially—in part at the expense of turnkey growth rates.

One important marketing tool for medical industry software vendors during this period will be to offer customers rapid applications updates (under maintenance contracts) when significant industry changes occur, such as publication by Medicare of new DRG reimbursement schedules.

Such growth will not be uniform among the application software subcategories, however. As has been the case for the last few years, given the increasing power and price-performance ratios of PCs and workstations, growth in mainframe and minicomputer software revenues will be modest, with five-year CAGRs of 5% and 7%, respectively. On the other hand, INPUT forecasts a CAGR of 25% for software that operates on PCs and

workstations—and especially calls vendors' attention to the market opportunities for the new generation of portable PC tablet systems that will require great sophistication in both client/server software functionality and in sophisticated GUIs that minimize or eliminate keyboard use.

Overall growth promoters for the *business services* sector are the trend toward a service economy and the fact that its businesses—such as real estate, law and accounting—are information-intensive.

Business services are projected to remain one of the fastest-growing industry-specific markets over the next five years, with a projected CAGR of 19%.

More than 60% of application software products expenditures in this sector are for PC- and workstation-based solutions. Minicomputer- and mainframe-based software growth should generally decline as companies make the transition to networked PCs. By 1998, the market for workstation/PC-based products should be more than four times the market for mainframe- and minicomputer-based products combined.

Insurance, the fifth largest industry-specific application software products sector, also should be the fifth-fastest growing sector of the Software Products market. Within the insurance information services market, only systems operations and systems integration delivery modes are expected to show higher growth rates (at 17%, compounded annually) than applications software products.

Many insurance companies have long-standing legacy systems developed to meet the business requirements of earlier decades. However, business operations and technology directions have changed, and insurers now find themselves needing to upgrade and replace these systems to meet today's requirements. While there is a well-documented tendency in the insurance industry for IS organizations to develop their own software, these companies are increasingly looking at packaged solutions to meet their needs.

In INPUT's survey of 100 insurance companies, 35% of the respondents planned to use packaged software solutions for new applications. With budget cutbacks, many companies simply cannot afford the high cost of maintaining a large, in-house programming staff. At the same time, vendors tailor their software solutions to the unique requirements within the insurance industry, and the availability of software is increasing.

The need for software is also fueled by the increasing need to make timely data more available to agents and employees who are using PCs and are purchasing laptops requiring PC-based software to analyze information provided by company databases.

Agencies rarely develop their own software, as they are typically small to mid-sized businesses that cannot support an internal technical staff. As agents make more use of technology, they will seek outside vendors for the applications software they need.

The *telecommunications* applications software products market, with a projected 20% five-year CAGR, is the second-fastest growing industry-specific applications software products market sector. From an expenditure base of $410 million in 1992, this market is projected to reach $1.2 billion by 1998.

The demand for applications software products for the telecommunications sector is driven by the need for minicomputer and workstation/PC software and growing demand for mainframe software in at least two critical areas.

Workstation/PC software is needed to support logistics and maintenance activities. Engineers must access central systems to obtain cable and circuit diagrams. Customer service and maintenance representatives also need to obtain information about the status of a customer's services. In particular, workstation/PCs are used more often to reduce the volumes of paper previously associated with service and work orders.

Imaging and mainframe-based artificial intelligence systems will be sources of significant growth over the next several years. These applications are only beginning to emerge, as carriers acquire increasingly sophisticated billing and customer support systems.

iii. Cross-industry applications software products market outlook

The largest cross-industry software products markets are office systems and accounting, as shown in Exhibit V-8, with the fastest growth expected from the Planning/Analysis market sector. The five cross-industry applications software products markets expected to show the fastest growth should set some trends for client/server-based solutions.

EXHIBIT V-8

Applications Software Products Market
Cross-Industry Software

Largest 1992	($ Millions)	Fastest Growing	CAGR (Percent)
Office Systems	2,700	Planning/Analysis	18
Accounting	2,450	Accounting	14
Planning/Analysis	1,900	Human Resources	14
		Engineering & Scientific	12

Planning and Analysis solutions are major beneficiaries of advances in RDBMS technology. The development of RDBMS has been a major factor in shaping the client/server computing model. Principal application areas in this cross-industry sector are spreadsheets, financial modeling, project management and executive information systems. The dominant platform for delivering for these applications is the workstation/PC. The workstation/PC segment of the planning and analysis cross-industry market is expected to grow at a CAGR of 21% over the next five years, expanding from a base of $1.8 billion forecast for 1993 to $4.7 billion in 1998.

Practically all expenditure growth for *Office Systems* software will come from workstation/PC product sales. The market for workstation/PC-based office systems applications software products is expected to expand from $2.4 billion projected for 1993 to $4.4 billion in 1998.

In the office products market, expenditure growth for mainframe- and minicomputer-based applications is due almost exclusively to price increases on previously existing word processing and integrated office systems licenses.

To remain relevant to PC-oriented offices, midrange vendors all have office systems strategies tying their minicomputers to PCs to share data and eventually work cooperatively. These vendors will do best in integrated office systems among their existing customer bases.

However, a transition has been under way for the last two years from host/terminal-based integrated office systems to client/server-based integrated office systems. All leading integrated office systems vendors, such as IBM, DEC, HWP, NCR and AT&T, are in the process of making this transition.

For *Accounting* cross-industry applications, there is currently a more even distribution among current expenditures by platform size. In 1992 mainframe applications software products expenditures were $850 million, minicomputer applications expenditures were $670 million and $1.1 billion was spent on workstation/PC applications software products.

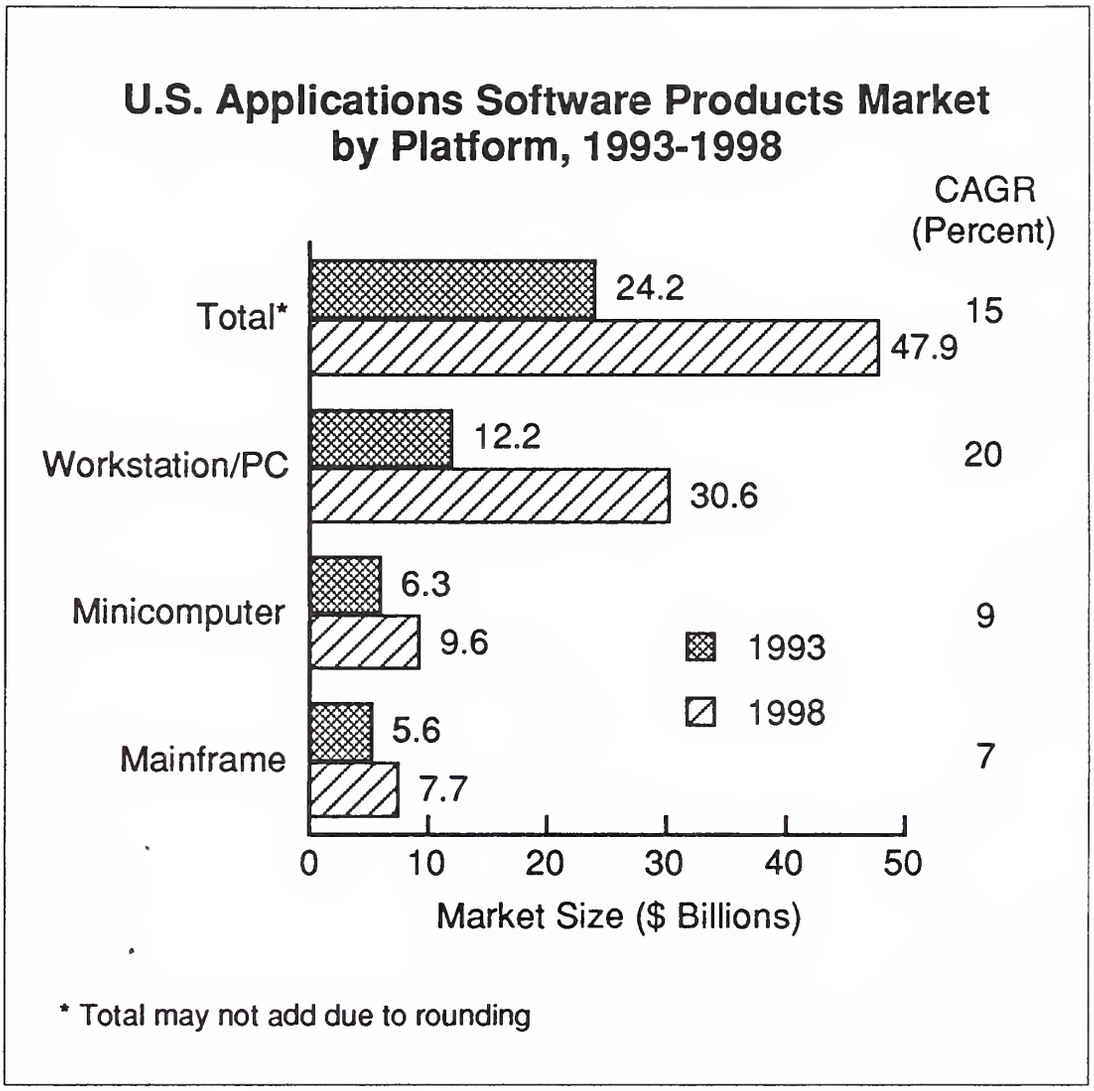
However, future expenditures are expected to be heavily weighted toward workstation/PC-based purchases, with an estimated growth rate of 19% in this platform submode.

User cross-industry accounting expenditures on mainframe-based packages are forecast to grow at 8%. However, these packages increasingly focus on flexibility, ease of use and client/server capability. As the forecast period progresses, users will decrease expenditures on upgrades and increase spending on migrations and client/server products.

As with mainframes, minicomputer-based accounting applications software products will continue to experience moderate growth (estimated at 7%, compounded annually over the next five years), but will eventually decline, even though midsized businesses and divisions of large corporations continue to purchase minicomputer-base accounting packages. Users have made considerable investments in midrange hardware over the last four years, and these platforms are better positioned to perform within client/server configurations and eventually be further downsized. Also, many vendors are developing UNIX-based products and targeting them at midrange systems users, which is sustaining midrange usability.

Exhibit V-9 points out the wide variance in growth expectations by platform size for the applications software products markets over the next five years, with the workstation/PC market continuing a strong 20% CAGR.

EXHIBIT V-9



B

Applications Software Products

1. Driving Forces

Applications software products vendors had a mixed year in 1992. For the number of companies that showed good comparative financial results, there were several notable exceptions. Principal factors negatively impacting a number of the companies in the industry in 1992 were: weak U.S. and worldwide economies; uncertainties about the correct approach to the downsizing computer paradigm, which apparently caused delays in new purchasing plans; and weaker pricing in industry segments (particularly PC and mainframe areas) due to more intensive competition and the slowing growth rate of mainframe hardware platforms.

Several applications software companies that outperformed the market were early innovators of client/server-based solutions and/or early adopters of open systems technology. In addition, special situations included companies such as Lotus, with particularly innovative solutions like the Notes groupware product.

Significant driving forces for the applications software products markets applications software solutions are listed in Exhibit V-10.

EXHIBIT V-10

Applications Software Products Market Driving Forces

- New client/server and enterprise-wide IS computing paradigms
- Increasing use of outsourcing for software application development
- Potential improvement is programming productivity with 4GL, CASE, and object-oriented application development tools
- Continuing shift to open system computing platforms
- Potential economic recovery in key international markets

The New Client/Server and Enterprise-wide IS Paradigms: The most significant driving factor in applications software purchases at this stage of the industry's maturity is the almost revolutionary change in technology related to downsizing computer applications. As mentioned earlier in this report, each of the past several decades has demonstrated shifts in IS paradigms, but the client/server and eventual enterprise environmental paradigms shifts of the 1990s are among the most radical. In addition, there appear to be considerably more pressures than in the past from senior corporate management on their central IS staffs to implement these latest paradigm shifts. With major new global competition and continuing recession in the U.S., corporate leaders are looking everywhere for cost reduction possibilities.

The need to rightsize corporate IS facilities has become the hue and cry of many corporate leaders. The client/server paradigm (which still has not been clearly defined), appears to be an answer because it presumably represents a lower-cost solution.

However, the complexities of implementing these distributed, network-based systems makes it difficult to measure success by traditional return-on-investment and length-of-payback models. In many cases cost reduction is not a major early outcome. Rather, at this stage of development, the technology might be measured more by qualitative standards such as improved decision support capabilities and increased flexibility of application development.

Vendors who have already introduced "easy-to-adopt" single solution-type client/server solutions and vendors who were early providers of value-added client/server extensions to their traditional product appear to strongly benefit as industry innovators at this stage of the market's development. The first group has helped create new market niches, and the latter have often extended the market opportunity for their current base product line.

Going forward, the logical extension of client/server technology is the enterprise environment. This shift will create even more solution complexity. However, it will also provide major opportunity for the "right" vendors.

INPUT believes that larger computer systems and systems software companies with strong application development tool frameworks for corporate-wide application development are best positioned for the enterprise-wide applications solutions markets. A principal benefit that companies with broad-based application development tool technology can bring to this market is more product application, product development and maintenance. Process development tools such as ProcessIT from NCR Corp. are one example of an enterprise application development tool framework.

In particular, applications software and systems software company partners with strong tool technology should be major beneficiaries of the anticipated acceleration in "outsourcing" by large corporations for application development. This will result in the increasing complexity of solutions and lack of ability to staff at the levels needed to develop such solutions internally.

Along with this, the improvement in fourth- and fifth-generation application development tools (including object-oriented application development tools) will increase the efficiencies of software product development and maintenance, and thus provide added support for developing new solutions for the lower-cost hardware platforms.

As more consensus is achieved on standards developments, the current (often unnecessary) cost of working with heterogeneous computing environments will diminish, further reducing the cost of moving to a distributed client/server environment.

The European economic recession may bottom. Since many software companies achieve more than 40% of their total sales to foreign sources, particularly Europe at this point, a recovery in this economic zone will be a plus, particularly in the near term.

Decreasing Corporate In-House Development: The move toward outside suppliers will be a corollary development of the increased complexity of the client/server computer paradigm shift.

2. Inhibitors to Growth

While the factors discussed above build a strong case for increased expenditures for applications software products, there are also some considerations that could inhibit growth, as shown in Exhibit V-11.

EXHIBIT V-11

Applications Software Products Market
Inhibitors to Growth

- User perceptions
- Lack of sufficient client/server investment payback models
- Economy
- Pricing
- Market structure

User Perceptions: Customers will spend more on packaged software in the next five years as the complexity of solutions increases in a distributed processing environment. How much depends in part on how well the vendor can change buyers' perceptions of packaged software. For buyers to switch to customized products, they must be convinced that the vendor understands their requirements and can develop solutions tailored to their needs. In-depth knowledge of particular industries will become increasingly important for applications software products vendors to address more specialized client requirements.

In other words, a major source of growth for applications software vendors must be the current in-house developed product market. The complexity of changing to a more customized product solution may be very difficult for many vendors. In particular, it could greatly increase product support costs further down the road, unless vendors can also obtain value-added pricing for such professional services as consulting and software product maintenance.

As previously mentioned, *limited satisfactory financial models demonstrate an improved return on investment for client/server implementations* compared to more traditional IS paradigms. Thus the movement toward client/server implementation may continue to be somewhat cautionary over the next few years. INPUT believes that more emphasis on industry standards and improved systems management software products will be significant factors in improving the applications development efficiencies of client/server implementations. In addition, the increased adoption of object-oriented programming models will improve interoperability and portability of applications, which should also be a major factor in cost reduction.

In addition, although a number of packaged client/server applications software products are becoming available, many are just repackaged versions of existing solutions offered until true client/server options (which can take considerable time and expense) can be developed.

The *slow rate of recovery of the U.S. economy* is a significant potential negative over the next several years. At this point, there is very little evidence of any significant economic recovery. In addition, the impact of recent federal income tax legislation plus the additional economic cost of national health care reform could cause even further slowing of U.S. economic growth in the latter half of 1993 and beyond.

Software pricing has become a major issue over the past year, especially for PC and mainframe software product vendors. Prices should continue dropping with the changes in licensing related to new platforms and usages and from bundling software solutions into product suites.

Independent software companies must look at alternative distribution channels to effectively address the pricing issue. Some newer alternatives include marketing through software publishers and/or large computer systems/systems software vendors. The latter could help leverage the application software company's marketing and product support efforts.

Market Saturation: During the 1980s, a reasonably good applications software product was an obvious improvement over former, typically manual, ways of performing a task, so was enthusiastically embraced with little question. Today, however, users already have some software solution in place and are willing to buy a replacement only if it provides new and better features than the software that is already installed.

C
Turnkey Systems Products

1. Turnkey Systems Market Overview

As previously mentioned, the total turnkey systems market is projected to reach $20.5 billion by 1998, representing a five-year CAGR of 8%, which is the same as INPUT's 1992 forecast.

The definition of a turnkey systems vendor has changed considerably in recent years. Historically, it represented more of a supplier of proprietary hardware, software (customized) and professional services, as a total solutions product.

More recently, total solutions product emphasis continues to define product delivery mode, but hardware, in particular, has become much less of the total revenue percentage along with much greater use of standardized hardware elements. Customized software is still an important part of the product definition, but the definition is shifting to include much more emphasis on customizable solutions.

At this point, it would appear that turnkey systems vendors who continue to show reasonable growth are those who have made the major adjustments to hardware platforms that are either much more open, are built upon standard components that can easily be upgraded, or provide a hardware solution that is so unique that it truly is a niche market solution, with value-added proprietary characteristics. The more successful models today include companies in the image pricing/document management market and in the telecommunications equipment market.

A general industry trend has been for traditional turnkey systems vendors to move toward unbundling product elements, often including the choice of additional third-party hardware and software as part of the total solutions sale.

a. Driving Forces

The key driving forces behind turnkey systems growth during the next five years are summarized in Exhibit V-12.

EXHIBIT V-12

Turnkey Systems
Driving Forces

- Solutions selling
- Specialized needs
- Client/server technology
- Systems software vendors as VARs

Solutions Selling: One key trend in the applications solutions market is focus on selling solutions instead of products. The end-user is becoming increasingly involved in purchasing decisions. These buyers are not interested in becoming technically savvy regarding systems implementation. Instead, buyers talk in terms of what they want to achieve from a business perspective, and expect the vendor to provide an easy-to-use solution to this need. Often this solution may require integration of a variety of products, customization and/or user support. Turnkey systems vendors are equipped to seize this market opportunity because their focus is to address a need through providing software packaged with hardware along with professional services. These vendors are often referred to as value-added resellers (VARs) due to the emphasis placed on the value they add to the generic hardware and software.

Specialized Needs: Many buyers believe they have unique needs that cannot be met today by packaged applications products. Yet corporations recognize the need to phase down in-house development.

Turnkey systems vendors have traditionally been better positioned than applications software vendors to address specialized needs. They have also traditionally focused their efforts on specific vertical markets. This knowledge of vertical markets, coupled with their experience in putting together solutions as part of their offerings, could position them well to address unique needs.

Client/Server Technologies: The ongoing technology changes toward downsizing and distributed (client/server) solutions should be beneficial to both the turnkey systems and applications software products providers. New technology creates a demand for new products and services, thus increasing the potential market.

In addition, more powerful and smaller hardware platforms facilitate a deeper penetration of applications solutions within smaller companies, and turnkey systems vendors generally sell to small and mid-sized firms.

An infusion of new products and increasing complexity of delivering solutions could fuel the turnkey systems/VAR channel. Turnkey systems vendors/VARs will add necessary customization. Other vendors' applications software products will be sold through the VAR channel and become part of the turnkey systems/VAR delivery mode.

Systems Software Vendors as VARs: The VAR delivery mode should also be seriously evaluated by computer systems and systems software vendors, particularly those with strong application development tool frameworks. Instead of referencing selling with software vendors, these companies should become in effect super-VARs, capitalizing on their customer bases, systems software strengths for customization of products and support capabilities. They should partner with strong applications software vendors, particularly with vertical market expertise, in effect to become their super-VAR. This would be particularly appropriate for addressing large corporate needs for customized solutions.

b. Turnkey Systems Inhibitors to Growth

Growth for the turnkey systems delivery mode will be inhibited by the factors listed in Exhibit V-13.

EXHIBIT V-13

Turnkey Systems Inhibitors to Growth

- Tight budgets
- Unbundling of hardware/software
- Competition

Tight Budgets: Turnkey systems providers/VARs have been particularly negatively impacted by IS budget constraints. Many turnkey systems vendors sell predominantly to small companies, which typically are the first to cut capital expenditures in economic hard times.

Turnkey and VAR service contracts and support services, however, are not as adversely affected by a weak economy. In fact, this portion of their business can expand as customers seek ways to leverage the products they already have.

Unbundling of Hardware/Software: Because hardware has become a commodity, buyers want to shop around for the best deal available and purchase software separately. Many turnkey systems vendors find that their hardware margins are so low that there are no real benefits from the hardware side of the business. The real revenue potential will come from software and professional services. Also, turnkey systems vendors don't want to limit their market to specific hardware platforms, particularly since users are looking for multiplatform solutions.

In addition, as personal computers have become more readily available at lower prices and through alternative distribution channels—including mail order, discount houses and superstores—advantages of turnkey systems have been eroded. Hardware sales are so price-driven that many VARs simply cannot afford to compete. The drop in applications software products prices (reflecting in part the lower-cost hardware platforms) will also continue to be a significant negative for the smaller VAR.

VARs and turnkey systems vendors are exiting the business for the follow reasons:

- Hardware margins are declining.
- The risk of being tied to an obsolete workstation is too great.
- They cannot afford to re-engineer their products or do not have the expertise to support the new products.
- They cannot afford to carry multiple hardware product lines if and when they adopt a multivendor, multiplatform strategy for their software.

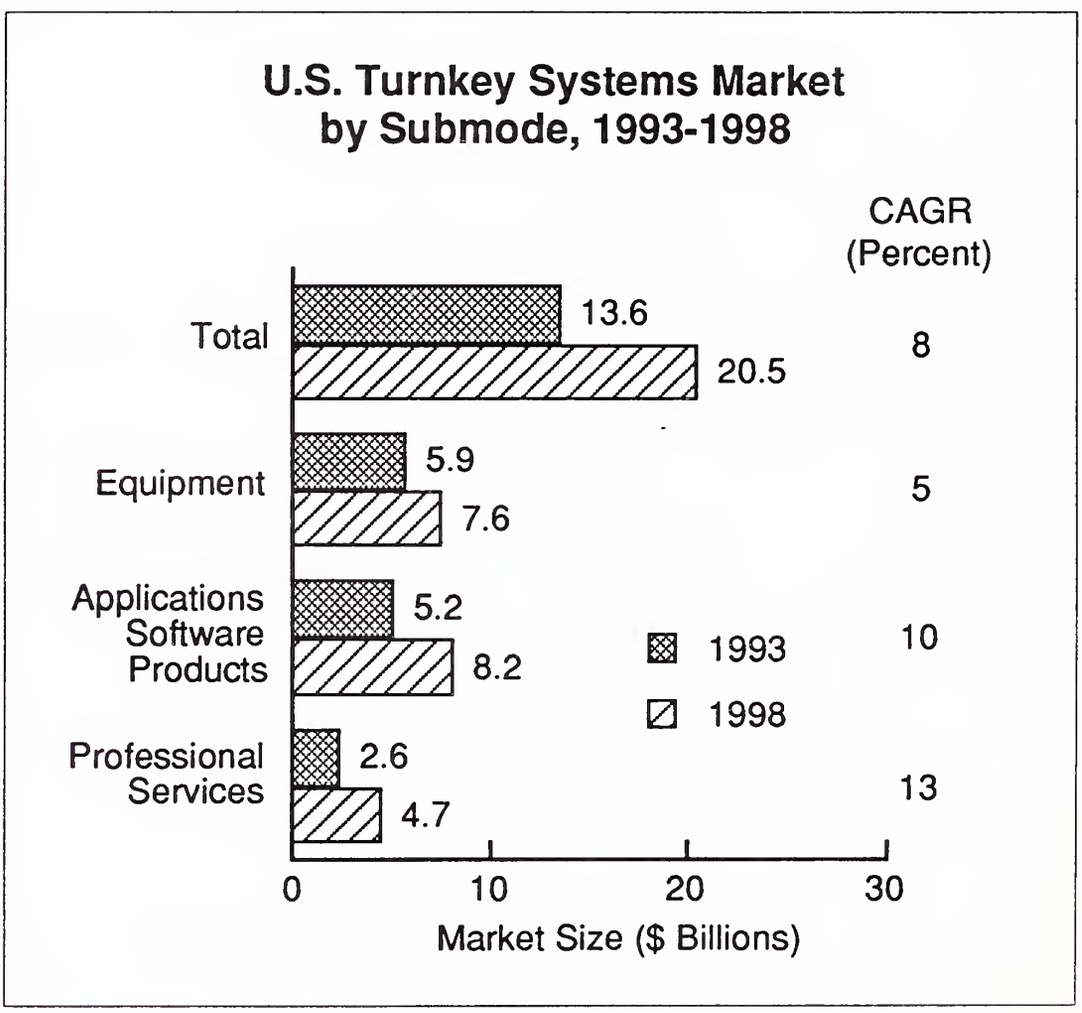
Competition: As hardware becomes a less profitable part of the package, turnkey systems vendors turn their attention to the software and professional services part of their service. This shift puts turnkey systems vendors in head-to-head competition with these types of firms, along with systems integration. The lines between these delivery modes blur as customers demand customized solutions to address their business needs.

Conversely, this shift provides significant opportunities for larger software products vendors to capitalize on the turnkey solutions delivery mode. Over the next five years, the more successful turnkey systems VAR/ vendors will likely be companies who were OEMs for the VARs in the past decade. In other words, growth in the VAR channel will be fueled by the large systems OEMs and systems software, applications software and professional services vendors, who have the marketing, support and customization capabilities to provide a turnkey solution to large corporations.

2. Forecast of Turnkey Systems Market by Submode, 1993-1998

Exhibit V-14 reflects the turnkey systems trends previously mentioned.

EXHIBIT V-14



The equipment portion of turnkey systems will continue its decline as a portion of the market. However, introducing of new hardware to address the market for client/server solutions could provide some enhanced opportunity for hardware equipment sales. Also, as hardware vendors seek new channels of distribution they will have incentive to negotiate favorable arrangements with turnkey vendors.

The applications software products portion of turnkey systems should grow at a compound annual growth rate of 10% through 1998. Favorably impacting growth in this submode will be an increase in the availability of new applications software products from independent software and systems vendors who are seeking alternative channels for their downsized products.

Professional services—including systems integration, UNIX, client/server implementation and customization—will attract VARs because of the higher margin potential with value-added pricing approaches.

3. Forecast by Industry-Specific versus Cross-Industry Sector

Primary markets for turnkey systems vendors are industry-specific markets and specific niche segments within such markets. Examples include hospital management, physicians' group practice and insurance agency systems.

The strongest industry-specific markets for turnkey systems vendors are listed in Exhibit V-15.

EXHIBIT V-15

Turnkey Systems
Industry-Specific Markets

Largest 1992	($ Millions)	Fastest Growing	CAGR (Percent)
Discrete Manufacturing	2,950	Telecommunications	13
Federal Government	1,120	Discrete Manufacturing	12
Banking/Finance	1,000	Process Manufacturing	10
Health Services	970	Banking/Finance	10
Business Services	890	Utilities	10
		State and Local Government	10

As with applications software products, the largest market and one of the fastest growing for turnkey systems is *Discrete Manufacturing*. Much of this growth is in engineering and design application solutions, fueled by major cost/performance improvements in workstation technologies.

The *Banking/Finance* industry-specific market represents the best combination of large size and above-average industry sector growth rate.

Turnkey systems vendors to this industry sector benefit from recent price/performance advances in minicomputer systems and increased sophistication and performance of workstation/PC-based systems.

These advances allow many turnkey vendors to offer small and midsized financial institutions significant power for in-house processing at much better hardware prices than in the past. This turnkey business, however, often comes at the expense of the processing services users relied on in the past. Attractively priced in-house processing resources drive this "insourcing" trend for small and midsized banks.

The *Telecommunications* turnkey systems market is also expected to grow at a somewhat faster rate than other industry-specific markets. As mentioned earlier, telecommunications turnkey systems represent one product area where there are niche hardware/software integrated solutions that can provide more broad-based equipment suppliers.

Also, telecommunications turnkey systems growth results from the specific need for an increasing number of application-driven services such as voice messaging, E-mail and EDI.

In addition, turnkey systems will become increasingly important to providers of more sophisticated cable TV suppliers as they broaden their services.

The large *Federal Government* turnkey systems market has been fueled recently by acquiring of turnkey desktop products. The federal government turnkey systems market is projected to grow at a slow rate of approximately 5%, compounded annually over the next five years, principally because of heavy budgetary constraints.

Scientific and engineering applications in the DoD, Commerce, NASA and Energy will need turnkey systems most. Engineering applications, particularly those employing 3-D characteristics, continue to be in relatively high demand.

In addition, document handling/image processing systems should have wide applicability across civil agencies. Many commercially available models are readily adaptable to a wide range of government document problems.

The *Health Services* turnkey market's growth rate is projected to be in line (at 8%) with the average growth rate for the turnkey systems market.

Historically, most medical turnkey systems were based on minicomputer hardware platforms and were most frequently used by smaller institutions with simpler operational needs, such as those operations that cannot afford the overhead of their own internal mainframe-based data processing capabilities and do not need the power of outside mainframe-based processing services. Many turnkey systems sold to the medical industry were for specialized departmental applications such as laboratory or radiology.

Today, however, more medical industry turnkey and application software vendors write their systems on generic PC platforms. They usually bundle the software with the lower-cost PC hardware or leave it to the buyer to purchase compatible hardware from one or more of the PC hardware vendors.

In addition, some large computer systems vendors are selling the required equipment directly to the purchaser of a turnkey systems/VAR business partner's software, rather than selling the equipment at wholesale to the turnkey partner for them to resell at a profit. A small, commission-like payment is then made to the participating business partner.

As a new generation of powerful distributed workstations enters the market, the same non-turnkey approach will likely take hold as well, especially as UNIX-based "open systems" workstation architectures provide a stable platform for software developers.

As seen in Exhibit IV-16, turnkey systems expenditures for cross-industry applications are considerably less, with *accounting* leading the list with $500 million in expenditures in 1992.

EXHIBIT V-16

Turnkey Systems
Cross-Industry Markets

Largest 1992	($ Millions)	Fastest Growing	CAGR (Percent)
Accounting	500	Education/Training	11
Sales (Marketing)	300	Sales/Marketing	8
Engineering/Scientific	130		

Growth in most of these areas should be modest, generally in the 4%-or-less range. Buyers are expected to be less likely to purchase cross-industry solutions as part of a turnkey package. For many of these applications, expenditures are likely to be for replacement packages. Requirements are generic enough that it is more cost-effective to purchase software separately from hardware.

Higher growth rates are expected in the education and training and sales/marketing areas. Turnkey systems in these area will continue to be popular because they can be delivered with equipment such as CD-ROMs and video disks for interactive graphics applications, which should find strong initial usage in training and sales applications.

Competitive Environment

A
Competitor Trends

1. Dominance of Large Vendors

The software industry has its roots in entrepreneurial ventures. INPUT estimates that approximately 97% of all vendors in the U.S. software products industries have revenues of less than $15-20 million.

While this plethora of small companies remains, industry "giants" heavily influence the direction of the particular applications software product markets.

Future leadership in the applications software products industry will be significantly impacted by declining software prices. Until the last two years, software product licensing and maintenance contract pricing tended to move up somewhat with inflation. Since 1991, software pricing, particularly PC software (horizontal applications) and "lower-end" mainframe product pricing have suffered substantial declines. Principal factors driving negative pricing have been: (1) market maturity for many desktop PC applications, which has led to (2) heavy product discounting, (3) bundled product suite marketing and (4) increasing competition for mainframe application solutions from lower-cost platforms.

Pricing declines resulted in significantly reduced revenue growth rates and profitability for many of the applications software products vendors in fiscal 1992. This trend will continue with the anticipated acceleration in the pace of downsizing throughout the 1990s.

The trend toward increased market share for large vendors will probably continue, as costs of product development, marketing and support accelerate. There will continue to be opportunities for the innovative, niche company, but many small to midsized companies must work with larger strategic partners or be acquired in order to survive.

The success of small start-up companies with client/server-based solutions, such as PeopleSoft, attests to continuing possibilities for entrepreneurial firms to succeed in a environment of large, well-entrenched competitors.

However, several factors increase the difficulty of competing in the applications solutions markets: the increasing complexity of product offerings, especially in the client/server environment, impacting new product development costs; the trend toward software product price declines, particularly evident over the past year; higher product support costs with greater product complexity; and market saturation in a number of product areas, requiring greater marketing sophistication to reach the larger available application solutions markets.

Many turnkey systems vendors were negatively impacted much earlier than the applications software product companies because the initial price declines in the applications solutions markets were in hardware. Most turnkey systems vendors originally achieved higher markets in hardware than software. Several went through major transitions in order to survive. These transitions has involved changing from a proprietary hardware focus to an open systems hardware platform, placing a greater emphasis on value-added software and professional services.

2. Increased Competition

The applications solutions products and services market is expected to become much more competitive over the next five years, aggravated by the market entrance of non-traditional technology competitors.

This competition will come from a variety of sources, as described below:

Equipment Vendors: The applications solutions market has traditionally been the domain of independent software vendors and turnkey providers. The primary business of these companies is to develop and sell packaged software solutions. However, as hardware increasingly becomes a commodity with decreasing margins, equipment vendors need to look to other sources of revenue. Equipment vendors will increasingly focus their efforts in the direction of software and services.

Despite overall poor performance on the hardware side, hardware vendors' market share of applications software products is expected to increase during the 1990s.

The major available market for applications solutions vendors, as emphasized earlier in this report, is the in-house corporate application development market. INPUT estimates this is more than 75% of the total available applications solutions market.

To address this market, companies will need critical product mass, a strong financial base, sophisticated application development tool technology and a strong marketing and support infrastructure. Additionally, they will need standard applications solutions products and vertical market expertise, which they may obtain from strategic partnering or acquisitions.

Major equipment vendors are expected to be positioned among the leading applications solutions providers in the second half of the 1990s.

Service Providers/Systems Integrators/Systems Software Vendors: Network and systems integrators offer the same kinds of services as many turnkey vendors/VARs and applications software product vendors, and often in greater depth and breadth.

In addition, some systems integrators buy the rights to applications software they developed for their customers and resell "shell" versions of it to additional customers.

Systems software vendors, particularly leading RDBMS companies, represent the newest competitive force in the applications solutions markets. Oracle Industries, with its application development templates and other strong application development tool technology, as well as software vendor and industry participant product alliances, provides one of the more sophisticated new marketing models.

3. Service and Customization Expansion

Availability of downsized, client/server-based solutions brings a host of complex product development, product integration and product support issues. Increasing emphasis on integration challenges vendors whose product lines consist of multiple applications that have been acquired (rather than "homegrown") along the way, and for vendors that do not have a complete suite of products.

A discernible shift is underway toward more tailoring of applications software products by software vendors and their customers. The ease with which a product can be tailored and the increased availability of tools with which to do this are compelling selling points.

The ability of users to gain true value from today's client/server applications products is predicated on some level of customization. This requires much more sophisticated application development tool capability, but down the road this could greatly increase the complexity of product support.

For vendors to maintain profitability levels in such an environment, they must obtain value-added pricing from a host of complementary services, including alternative maintenance and service/support contracts that recognize the higher vendor costs related to customized product development and maintenance. The larger equipment and systems integration vendors can more easily move into the area of application development outsourcing, which is the large available potential market for applications solutions vendors.

4. International Market

Software solutions vendors derived a significant portion of their revenue in recent years from their overseas operations. Exhibit VI-1 shows percentages of revenues from foreign operations for several leading U.S.-based vendors in their most recent fiscal year.

EXHIBIT VI-1

International Revenues*
U.S.-Based Independent Software Companies

Vendor	Percent of 1992 Revenues International
Computer Associates International	53
SAS Institute	51
The ASK Group	50
Borland International, Inc.	48
Lotus Development Corporation	46
Microsoft	45

* INPUT Estimates

While the U.S. still represents the largest single market for packaged software solutions, the maturity of certain segments will make vendors increasingly rely on international sales for growth. This requires a greater emphasis on multilanguage releases and products tailored to the unique functional requirements of various cultures and economies.

A number of turnkey vendors/VARs are expanding regionally and nationally, as well as selling internationally. VARs form strategic alliances with each other or acquire other VARs as a means of expansion. Control Data, for example (a recent spinoff of Ceridian) recently acquired Evernet Systems, a larger VAR which grew in recent years by acquiring smaller, regional VARs.

B

Leading Vendors

The leading applications solutions vendors are shown in Exhibits VI-2 and VI-3. Revenues for each company are developed from INPUT's vendor files and surveys.

EXHIBIT VI-2

Leading Independent Vendors
U.S. Packaged Software Services 1992 Revenue

Vendor	1992 Revenues* ($ Millions)
Microsoft	520
Lotus Development Corporation	360
Computer Associates International	270
Policy Management Systems	330
Dun & Bradstreet	260
Cadence Design	163
Borland International, Inc.	140
Electronic Arts	135
Autodesk	115
WordPerfect	115
SAS Institute	110

* INPUT Estimate, revenue includes U.S. revenue for packaged software which in some cases includes systems software.

EXHIBIT VI-3

Leading Turnkey Systems Vendors*

Vendor	1992 Revenue ($ Millions)
Intergraph	1,180
Mentor Graphics	400
Reynolds & Reynolds	250
ASK Computer	180
Octel	190
Filenet	140

* INPUT Estimates

The largest vendors in the 1990s will not necessarily be the same as the leaders in the 1980s. Companies will not only need major marketing and services support capabilities but, as the market switches to client/server architectures, vendors who successfully re-engineer their software in a timely manner will be positioned for continuing leadership. A number of leading applications software companies had significant disruptions during the 1992-1993 period in their traditional above-average growth patterns, due to factors such as increasing competition and the impact of downsizing on companies who have not refocused product direction toward the client/server architectural environment.

Although computer systems vendors that also sell their own software bundled with their general-purpose hardware are not considered for this report to be turnkey systems vendors, in the future their product offerings are expected to provide more total applications solutions. In the future, composition of the applications solutions market will change to include other traditional delivery mode vendors, such as systems integrators, equipment vendors, professional services/systems integration and systems software companies.

Following are profiles of several applications solutions companies (applications software products and turnkey systems). They represent types of companies and strategies currently operating in the application solutions marketplace. Exhibit VI-4 lists these firms.

EXHIBIT VI-4

Vendors Profiled

- American Management Systems, Inc.
- Cerner Corporation
- Global Software, Inc.
- PeopleSoft, Inc.
- SAP America

1. American Management Systems

1777 North Kent Street
Arlington, VA 22209
Phone: (703) 841-6000
Fax: (703) 841-5584
Chairman: Charles Rossotti
Vice Chairmen: Paul A. Brands
Patrick W. Gross
President: Philip M. Giuntini
Status: Public Corporation
Stock Exchange: NASDAQ
Total Employees: 3,566 (6/93)
Total Revenue: $332,544,000
Fiscal Year End: 12/31/92

a. Key Points

- AMS' fastest growing vertical market business is telecommunications, which increased 89% during 1992.

- AMS' client/server system development business quadrupled in 1992 to more than $60 million. A large portion of AMS' other business also made partial use of open systems built with client/server architectures.

- International services and products revenue increased 88% during 1992. New clients have been added in the financial services and telecommunications markets. AMS now has offices in six European cities.

- Services and products revenue from the energy industry dropped 26% during 1992. Effective in early 1993, AMS eliminated energy industry clients as a separately reported market, with revenue now reclassified under federal government agencies and other corporate clients.

- During 1992, as part of the company's growth strategy, AMS announced a management reorganization, appointing Paul Brands as Vice Chairman and Philip Giuntini as President.

- During 1993, AMS established the AMS Center for Advanced Technologies to identify and capitalize on the application of emerging technologies.

- AMS management projects that 1993 revenue will be $383 million to $393 million.

b. Company Description

AMS, founded in 1970, provides systems integration, consulting, re-engineering and systems development (including reusable and custom software) services to many of the country's largest corporations, hundreds of city and state governments and the federal government, as well as large international organizations.

Since 1982, AMS has specialized in providing services to large financial services firms, federal government agencies, state and local governments, colleges and universities, energy industry clients and telecommunications companies as follows:

- Financial services institutions: AMS provides application solutions and consulting to large money center banks, major regional banks, insurance companies and other large financial services firms, specializing in corporate and international banking, consumer credit management and bank management information systems.

- Federal government agencies: AMS provides consulting, business process re-engineering services, systems operations and system development and implementation services to civilian and defense agencies and aerospace companies.

- State and local governments and education: AMS provides professional services and strategic applications to city, county, state and provincial governments; local school districts; and colleges and universities.

- Telecommunications firms: AMS provides professional services and strategic application development and implementation services for telecommunications companies. AMS has developed large-scale systems for message and usage processing, customer support, customer billing, accounts receivable, collections and order management for local exchange and interexchange carriers and cellular telephone companies.

- Energy industry clients: AMS provides applications and professional services for general accounting and financial management reporting, revenue accounting and distribution and property accounting functions to large energy companies and federal and state agencies.

- Other: AMS provides various professional services for large firms in other industries.

In September 1989, IBM acquired a 10% equity interest in AMS for approximately $18 million.

- IBM and AMS also entered into a multiyear agreement under which AMS worked on the development of application software for IBM. Services and products revenue generated from work performed for IBM was approximately $23.2 million in 1992, $22.3 million in 1991 and $21.9 million in 1990.

- AMS is an IBM Business Partner—Authorized Industry Application Specialist.

- In June 1991, AMS announced support for IBM's Image and Records Management System (IRM) for systems integration services (IRM customization and installation) and integration of IRM with AMS applications for vertical markets. AMS played a key role in developing this imaging technology.

- In August 1991, AMS was announced as a participant in IBM's Cooperative Software Program (CSP) with its LEGEND series of administrative applications for the higher education market.

- Work for IBM declined. In early 1993, AMS renegotiated its agreement to receive compensation for the reduced level of business AMS expects in 1993 and 1994 from IBM. AMS also repurchased AMS preferred stock owned by IBM, bringing IBM's ownership to approximately 5%.

- The current primary emphasis on the AMS/IBM relationship is to provide large IBM and AMS clients with business consulting and applications.

c. Strategy

The fundamentals/core strengths of AMS' business include:

- Providing business/technology analysis and consulting;
- Developing, integrating, and implementing computer-based systems;
- Developing reusable applications for business functions;
- Managing long-term client relationships.

AMS derives approximately 85% of its business each year from clients with whom it worked in the previous year. During 1992, 91% of AMS' revenue was derived from clients served in 1991.
AMS' overall strategy for the 1990s includes:

- Specializing by industry, business function and client size;

- Managing and building on long-standing relationships with major clients in vertical markets;

- Acting as a full-service business partner for clients in AMS' vertical markets;

- Taking responsibility for results—not simply providing resources;

- Forming alliances and partnerships with clients and other firms.

AMS targets a 20% annual growth in service and products revenue for the 1990s. AMS' growth strategy includes:

- Selling existing capabilities within existing vertical market segments;

- Growth within existing vertical markets by expanding into additional market niches

  - Along functional lines, examples includes corporate risk management, STRATA (behavior scoring for collections), retail payments, and CARE (Customer Analysis and Relationship Enhancement) programs in financial services markets; financial systems in the telecommunications market; ClaimsFlo program in insurance; criminal justice and human services systems in state and local government; sponsored research programs for colleges and universities; procurement support, activity-based cost accounting and BPR and imaging systems for federal civilian agencies; and intelligence and claims management systems for federal defense agencies.

  - Along technology lines, examples include application downsizing, imaging, graphical user interfaces and mobile computing.

- Expanding internationally in Europe by increasing staff from over 60 to 100, increasing offices from four to six and targeting revenue growth from $18 million in 1992 to $28 million in 1993. Long-term growth markets include financial services (25%) and telecommunications (30%);

- Pursuing selected opportunities that require the combined expertise from two (or more) vertical market segments. Examples include federal financial systems and state environmental programs, telco risk management, revenue management systems for state and local governments and imaging for financial institutions;

- Periodically, starting a new vertical market segment as appropriate (e.g., pharmaceutical industry).

Long-term U.S. growth targets for AMS' vertical markets include telecommunications (25%-30%), insurance (20%-25%), financial services (20%), state and local government (20%), colleges and universities (20%), federal civilian (15%-20%), federal defense (5%-10%) and other (up to 5%).

In the area of AMS' client/server technology focus, the company's strategy is to:

- Deliver client/server solutions with integration to legacy systems;

- Design advanced user interfaces through user-centered methodologies;

- Use object-oriented techniques through tools and analysis;

- Create open systems by capitalizing on standards.

2. Cerner Corporation

2800 Rockcreek Parkway
Suite 601
Kansas City, MO 64117
Phone: (816) 221-1024
Fax: (816) 221-0179
Chairman & CEO: Neal L. Patterson
President & COO: Clifford W. Illig
Status: Public Corporation
Stock Exchange: NASDAQ
Total Employees: 653
Total Revenue: $101,145,000
Fiscal Year End: 12/31/92

a. Key Points

- Cerner's vision of health care computing is supported by its Healthcare Network Architecture (HNA), an information architecture with the patient as its major focus. HNA is designed to automate the patient care process for diagnosing and treating the patient's medical problems, both in the short and long term, across the in-patient, ambulatory and community settings.

- Over the last several years, Cerner has invested in expanding its organization internationally. During 1992, international operations contributed $5.8 million to revenue and $3.8 million to gross profits, representing increases of 19% and 21% respectively, over 1991.

- In order to develop stronger client relationships, Cerner announced the regionalization of its client services organization and plans to open eight branch offices across the country.

b. Company Description

Cerner Corporation, founded in 1980, develops, markets and supports turnkey systems in clinical departments of health care providers such as hospitals, clinics, HMOs and reference laboratories. The company is a member of DEC's Cooperative Marketing Program.

c. Strategy

Cerner management believes that there are significant opportunities for a company that delivers products that provide integrated clinical information to medical professionals responsible for patient care.

Cerner's product strategy is to expand its information system offerings to the broad range of clinical departments and to provide a database of integrated patient information useful to both the practitioner and the health care manager. In addition, Cerner's strategy is to design its products so that they may be easily modified or enhanced to take advantage of changes in medical and information system technologies.

To effect this strategy, Cerner developed the Healthcare Network Architecture (HNA), which provides the structure and common software functions necessary for development and interaction of all clinical information systems.

d. Competitors

Competitors by application area include the following:

- In the clinical laboratory market, Cerner generally competes with Community Health Computing, Lab Force and Sunquest Information Systems.

- In the respiratory care and pulmonary physiology markets, competitors include Puritan-Bennett Corporation and Tenet Information Systems.

- Multiproduct health care information systems competitors include 3M, Shared Medical Systems, HBO & Company and American Express.

e. Key Products and Services

Approximately 71% of Cerner's 1992 revenue was derived from turnkey systems, 26% from software support and hardware maintenance services and 3% from hardware sales to existing customers. The majority of revenue is derived from PathNet licenses and maintenance services.

Cerner's turnkey clinical information systems are designed to operate on DEC VAX computers. The company currently has over 270 customers in the U.S., Canada, Saudi Arabia, the U.K., Australia and Singapore.

PathNet, the company's flagship product, targets clinical laboratories. PathNet automates ordering and reporting procedures, report production and maintenance of accessible clinical records.

- PathNet 300, introduced during the second quarter of 1988, is the upgrade of the company's PathNet Laboratory Information System and includes significant functional and technical enhancements to the product.

- PathNet addresses the information needs of five clinical departments: general laboratory, microbiology, blood bank transfusion services, blood bank donor services and anatomic pathology.

- Additional HNA systems are available with PathNet, as with all of Cerner's major clinical systems, for management, commercial, productivity and decision support applications that assist clinicians in marketing their services and controlling their resources.

- As of December 1992, PathNet was licensed to 293 clients in the U.S. and Canada, 16 clients in the U.K., one client in Singapore, three clients in Saudi Arabia and three clients in Australia. Installations are in hospitals ranging in size from approximately 70 to 1,650 beds.

- The price of a PathNet system generally ranges from $100,000 to $3.3 million per installation, including hardware.

The MedNet Pulmonary Medicine Information Systems product line, introduced in 1987, addresses the information processing needs of the medical-related service areas. MedNet respiratory care and pulmonary physiology systems are currently available.

- The systems automate procedure requests, patient and therapist scheduling, and the processing, validation and presentation of results. Reports on clinical activity, work load and billing charges are provided by drawing from departmental databases.

- As of December 1992, MedNet had been licensed to 10 clients in the U.S. and Canada.

The RadNet Radiology Information System, introduced in 1989, addresses the operational and management requirements of diagnostic radiation and radiation oncology departments.

- The system automates such tasks as scheduling patients, modifying orders, tracking patients, locating films, transcribing reports, upgrading the quality and content of reports and productivity reporting.

- RadNet had been licensed to 26 clients in the U.S. and Canada and to three clients in Saudi Arabia as of December 31, 1992.

The PharmNet Pharmacy Information System, released commercially in 1989, supports the hospital-based pharmacy department. Daily pharmacy operations, clinical pharmacy support and integration with other Cerner clinical information systems is provided. PharmNet has been licensed to 30 clients in the U.S. and Canada and three clients in Saudi Arabia as of December 31, 1992.

The ProNet Patient Information System, released in 1990, supports order entry, order review and/or validation, interdepartmental communications and order and result inquiry and reporting.

- The system, driven by a comprehensive security matrix, also provides access to patient demographics, admissions, transfer and discharge information.

- ProNet was licensed to eight clients in the U.S. and Canada as of December 31, 1992.

The CareNet Nursing Information System, introduced in 1990, automates documentation related to nursing care delivery within an institution. All information that nursing staff members enter into CareNet is automatically transcribed to all appropriate locations in the patient's medical record. As of December 31, 1992, CareNet had been licensed to six clients in the U.S. and Canada.

The Open Clinical Foundation Data Repository (OCF) clinical data system is a structured repository for clinical information. OCF was commercially introduced in 1992 and had been licensed to four Cerner clients in the U.S. as of December 31, 1992.

PowerChart gives health care providers structured access the clinical information contained electronically in the OCF.

- It enables care-providers to electronically view, sort, annotate and amend a patient record using patient-provider and encounter relations. Clinicians are able to access documents, data, images, and voice in many formats, including flowsheets and graphs.

- PowerChart was commercially introduced in 1992 and had been licensed to three clients in the U.S. as of December 31, 1992.

Products under development include:

- The MRNet Medical Records Department Information System will address the operations management needs for chart tracking and completing tasks commonly associated with maintaining medical records.

- The SurgiNet Surgical Information System will address the needs of the surgical department, including automating scheduling, inventory management and clinical information management.

- The Open Management Foundation Data Repository (OMF) is a structured repository for process and activity-related information useful for management of the health care institution.

- PowerVision will be a PC-based executive information system.

Substantially all of Cerner's customers enter into hardware and software maintenance agreements with Cerner. In the majority of cases, Cerner subcontracts hardware maintenance to DEC. Each customer has 24-hour access to the customer support staff located at Cerner's headquarters.

f. Industry Markets

One hundred percent of Cerner's revenue is derived from the medical industry.

The market for Cerner's clinical information system products includes hospitals, HMOs, clinics, independent reference laboratories and blood bank commercial labs. The majority of system sales to date have been in hospital-based provider settings. Cerner currently services hospitals ranging from less than 100 to more than 1,000 beds.

Clients currently using PathNet represent the primary target market for MedNet, RadNet, PharmNet, ProNet, CareNet and OCF/PowerChart.

g. Geographic Markets

Approximately 94% of Cerner's 1992 revenue was derived from the U.S. and 6% from international sources.

3. Global Software, Inc.

1009 Spring Forest Road
Raleigh, NC 27615
(919) 872-7800
(800) 326-3444
President: Ron Kupferman
Status: Subsidiary
Parent: Hathaway Corporation
Total Employees: 250
Total Revenue: $26,300,000
Fiscal Year End: 6/30/92

a. Key Points

- Global Software, Inc. develops, markets and supports IBM-based accounting applications software products for clients across industries, as well as vertical software products for the health care industry.

- In June 1992, Software Magazine picked Global Software as one of the Top 100 Leading Software Vendors in the United States.

- Global Software offers client/server-based software applications. These applications face increased competition in 1993 as PeopleSoft and Integral Systems enter the client/server financial applications market.

- Global Software has invested approximately 18% of total revenue per year on research and development, focusing on new client/server applications.

b. Company Description

The company provides various professional services in support of its products.

- Global Software was formed in 1981 by a group of former Informatics General employees who purchased the rights to Informatics' cross-industry accounting applications software packages.

- In May 1985, Global was acquired by Hathaway Corporation (Denver, CO) for $6.9 million in cash and notes.

c. Strategy

Businesses turn to client/server accounting packages to increase business unit or department responsibility for their own accounting processes. Global Software's product, Harmonix, is an accounting software application that is based on client/server technology.

Global Software targets international markets for its health care applications. The primary operational focus for health care applications is materials management and financial reporting.

d. Acquisitions/ Divestitures

Acquisitions
In December 1990, Global Software acquired Compro Corporation of Norcross (GA). The purchase included five application packages (accounts receivable, fixed assets, general ledger, accounts payable and forecasting), as well as customer support facilities in Atlanta, 13 employees and about 100 Compro customers under maintenance and contracts.

Divestitures
In 1991, the CARMS (Credit and Accounts Receivable Management System) financial system was sold to Walker Interactive Systems, Inc. for $6.75 million.

e. Alliances

Global Software has strategic partnering relationships with several vendors, including IBAX (a major health care supplier) and several Big 6 accounting firms.

f. Competition

Major competitors include D&B Software, Computer Associates, J.D. Edwards and Software 2000.

g. Key Products and Services

Global Software derives approximately 70% of its revenue from software products (30% license fees and 40% maintenance fees). The remaining 30% of revenue is derived from associated support services, such as software installation, consulting and education and training.

Global Software's accounting software products can operate individually or as an integrated system.

- The products operate on IBM 43XX, 30XX, 937X and compatible mainframes under DOS/VSE, MVS/SP, MVS/XA, CICS , IBM System 38 minicomputers and AS/400 systems.

- The midrange business unit offers an integrated Financial Control System for the IBM AS/400 that includes modules for general ledger, financial analysis, inventory, accounts receivable, cost control, accounts payable, purchase order and fixed asset accounting applications.

*S*W*A*T Software Walkthrough*
Global Software offers S*W*A*T™ (Software Walkthrough), a program designed to implement the purchase of Global Software products. Software installation and personnel training is usually accomplished within 30 to 90 days, depending on the client's environment.

- The S*W*A*T approach consists of several phases:

  - Pre-S*W*A*T I: Global Software staff comes on-site to review the company's requirements.

  - Pre-S*W*A*T II: A second consulting session is held on-site to review and validate converted data.

  - S*W*A*T Workshop: Clients attend a five-day training session conducted at one of Global Software's S*W*A*T centers.

  - Post-S*W*A*T: Additional management training, consulting, technical assistance, and end user training is performed on-site some time after the S*W*A*T Workshop. Support is provided to review progress, answer questions and fine-tune the system.

- S*W*A*T pricing ranges from $15,000 to $55,000. More than 600 companies have used the program.

Annual Improvement, Maintenance, and Support
Global Software provides customer service through a program called Annual Improvement, Maintenance, and Support (AIMS).

- An AIMS agreement provides customers with:
  - Product enhancements stemming from user requirements;
  - Monthly distribution of program fixes;
  - Toll-free telephone hotline service 24 hours a day;
  - Newsletters that provide the status of program fixes and product development efforts.

- An AIMS contract is priced at approximately 11% to 18% of the existing product license fee per year.

h. Industry Markets

Most of Global Software's revenue (60%) is derived from clients across industries. The company gets 40% of its revenue from vertical products for the health care industry. Clients include small to large companies in manufacturing, distribution, utilities, transportation and health care industries.

i. Geographic Markets

About 95% of Global Software's fiscal 1992 revenue was derived from the U.S. and 5% from Canada, the U.K. and other foreign countries.

4. PeopleSoft, Inc.

1331 North California Boulevard
Walnut Creek, CA 94596
Phone: (510) 946-9460
Fax: (510) 946-9461
Chairman & CEO: David A. Duffield
Status: Public
Employees: 188
Revenue: $31,565,000
FYE: 12/31/92

a. Key Points

- PeopleSoft specializes in financial management and human resources applications software products that use client/server technology. PeopleSoft applications are supplied as client/server applications, designed specifically to take advantage of Microsoft's Windows' client and SQL databases.

- In 1992, PeopleSoft experienced an 85% revenue growth rate, a 25% pre-tax profit margin and a 165% increase in earnings.

- PeopleSoft characterizes itself as a close-knit team of systems designers, engineers, marketers and customer service personnel who specialize in emerging technologies, human resources and financial systems. PeopleSoft has also gained recognition in the software industry for the experience and quality of its management team.

- In 1992, PeopleSoft raised $35 million through an initial public offering of 3,000,000 shares.

- One key competitive advantage that PeopleSoft has in the marketplace is the high productivity level of each employee. At approximately $240,000 per employee, productivity is much higher than industry averages.

b. Company Description

PeopleSoft, founded in 1987, specializes in financial management and human resources applications software products that use client-server technology. Products are designed for medium- and large-sized organizations. The company's first product, the PeopleSoft Human Resource Management System (PS/HRMS), was released in April 1989.

PeopleSoft's founder, David A. Duffield, previously founded two other software firms:

- Information Associates, Inc. (IA), founded in 1968, was Duffield's first company. IA developed financial, human resources, and student information systems for public colleges and universities, and is now a part of Systems and Computer Technology.

- In 1972, Duffield founded Integral Systems, currently a major player in the mainframe human resource software market. He remained chairman and chief product architect at Integral Systems until his departure to form PeopleSoft in 1987.

c. Strategy

PeopleSoft's mission is to lead the global market for client/server business software. To do so, PeopleSoft positioned their products to address the following current market and technology trends:

- Increased desktop computing power;

- Increased use of GUIs;

- Inexpensive local storage;

- Sophisticated relational databases;

- Heterogeneity of computing environments;

- Movement of mission-critical business applications to client/server environments.

PeopleSoft has specifically designed its products to work on the client/server model of computing. In this model, processing is distributed between a personal computer client and the server, with clients running Microsoft Windows or Windows NT connected to the following server

platforms; MVS, VMS, UNIX, MPE, OS/2 and Windows NT. The products work on a wide range of hardware platforms, including IBM mainframes, UNIX-based minicomputers for Digital Equipment Corporation, Hewlett-Packard computers and personal computers operating on a local-area network.

The company's target market includes Fortune 1000 companies and medium-sized organizations or divisions requiring enterprise-level software applications.

PeopleSoft is the market leader in client/server Human Resource (HR) software arena. However, since its entry into the market two years ago, competition has significantly increased as other established HR vendors and new start-ups rush to bring out their own client/server products.

With the announcement of plans for financial applications, PeopleSoft is positioning itself to enter a new arena. The company faces a major challenge moving from its initial niche market in human resources to a broader market with differing software requirements and a new set of buyers.

One of PeopleSoft's strategic goals is to expand its international presence. The company currently offers a Canadian version of PS/HRMS that addresses specific Canadian regulatory and tax requirements. In 1991, PeopleSoft established initial international sites in Western Europe and the Far East. During 1992, PeopleSoft commenced international sales activities and established a support operation in the Netherlands.

In addition, PeopleSoft, to enhance distribution of its PS/HRMS and PeopleTools products, recently entered into a licensing agreement with ADP under which ADP may sublicense these products to third parties in the United States and selected other countries.

d. Alliances

On June 16, 1993, PeopleSoft and Datalogix International, Inc. announced an agreement to integrate portions of their client/server applications. The agreement covers PeopleSoft's HRMS human resource applications and Datalogix's Global Enterprise Manufacturing Management System (GEMMS).

In 1992, PeopleSoft signed an agreement with Automated Data Processing (ADP) to license PeopleSoft's PS/HRMS product line to its clients in the United States and internationally. This agreement provides a channel for PeopleSoft products to a smaller company market.

e. Competition

PeopleSoft currently offers human resource management systems and plans to offer financial system application software products. The markets for both these products are very competitive. The primary competitors for HRMS products are: Cyborg Systems, Dun & Bradstreet Software, Genesys, Integral Systems, Oracle Corporation, Ross Systems, Inc. and Tesseract.

Competitors in the financial systems market include: ASK Group, Computer Associates, Dun & Bradstreet Software Corporation, Integral Systems, Oracle, Platinum Software Corporation, Ross Systems, Inc., SAP America and Walker Interactive Systems.

f. Key Products and Services

Approximately 71% of PeopleSoft's 1992 revenue was derived from software product licenses. The remaining 29% was derived from professional services. There are currently more than 100 client companies using PeopleSoft PS/HRMS products.

PeopleSoft products are based on an architecture using GUIs, multiple RDBMs, multiple hardware platforms, distributed processing and application development tools.

Human Resources Systems:
PeopleSoft's primary software product is the PS/HRMS human resources system that includes payroll, personnel and employee benefits applications. PeopleSoft HRMS 3.0 was introduced in 1992. This new release of the HRMS product line includes two new modules: international functionality and career planning. The product has a Microsoft Windows graphical user interface and operates on a variety of computers, midrange and SQL databases (DB2, DEC RdB, Gupta SQLBase, HP Allbase, Microsoft SQL Server, Oracle, and Sybase System 10).

PS/HRMS 3.0 is a family of fully integrated human resource management system products available in U.S. and Canadian versions.

- PS/HR—includes basic functions to support the administrative, planning and management functions of a human resources department. Functions of this component include personnel administration, recruitment, position management, training and development, health and safety, skills inventory career planning, affirmative action planning and government compliance reporting for EEO. With the PS/HR module as a foundation, the following modules can be added.

- PS/Benefits—An administration module that provides support for daily benefits administration activities. This module supports both flexible and nonflexible benefits programs requiring eligibility checking, open enrollment processing and other automatic enrollment processing capabilities. This module also provides user-defined benefit eligibility criteria, enrollment rules and flexible credit calculations as well as open enrollment and event maintenance.

- PS/FSA—A flexible spending account (FSA) administration module offering a comprehensive flexible benefits software solution. The module includes capabilities for FSA claims tracking and processing, extensive editing to ensure that funds are available and support for check preparation for reimbursements.

- PS/Payroll—controls payroll department operations such as time reporting, payroll computation, tax calculations, payroll reporting and tax reporting.

- PS/Paylink—This module provides an interface between the PS/HRMS data and third-party payroll systems.

The PS/HRMS system design is based on client-server architecture. The system can be operated across multiple platforms. LANs and mainframe gateways may be used to provide access to a mainframe server running DB2. PeopleSoft delivered Release 3.0 of its PS/HRMS family of products in February 1993.

PS/HRMS pricing depends upon the hardware platform, RDBMS configuration for the system, the PS/HRMS modules chosen and the employee population of the company using the software. List prices for license fees range from $130,000 to $490,000 for PC workstation implementations, from $160,000 to $600,000 for minicomputer server implementation and from $230,000 to $800,000 for mainframe server implementations. These license fees include one copy of the software, system and user documentation, one year of product maintenance, a one-year product warranty, implementation support, and training.

Financial Systems:
In 1992, PeopleSoft released the first two modules of the PeopleSoft financial application product line. The three-year development effort culminated with the release of PeopleSoft General Ledger (PS/GL) and its companion, PS/nVision, an interactive query and reporting tool.

In February 1993, PeopleSoft announced delivery dates for three new PeopleSoft Financials products, PeopleSoft Accounts Receivable (PS/AR), PeopleSoft Accounts Payable (PS/AP) and PeopleSoft Asset Management (PS/AM). Both PS/AR and PS/AP are planned for beta release in the second quarter of 1993, and PS/AM is schedule for beta release in the third quarter.

- PS/GL—(available since the second quarter of 1992) functionality includes unlimited chart of accounts, customer-defined ledgers, graphical maintenance of organizational structures using the PeopleTools Tree Editor, flexible calendars, enhanced journal entry processing, budgeting and allocations. PS/nVision enables users to easily produce reports.

- PS/AR—(available the second quarter of 1993) manages cash collection and customer receivables for a wide variety of industries and provides information to improve cash and credit management.

- PS/AP—(available the second quarter of 1993) authorizes and records the obligation and payment of invoices while providing tracking features to better deploy corporate resources.

- PS/AM—(available the third quarter of 1993) provides the features necessary to record the acquisition, depreciation and retirement of capitalized assets. It manages "non-traditional" asset information such as maintenance contracts and schedules, upgrade options, resale schedules, insurance coverage, replacement options, budgets and lease terms.

Development Tools:
PeopleSoft includes a license to PeopleTools, a customization and development tool with each application software product shipped. In 1993, PeopleSoft announced plans to market PeopleTools to customers and prospects as a separate product line. PeopleTools runs in Microsoft Windows, enabling analysts to build mission-critical applications using components that maximize application development productivity.

PeopleTools consists of the following:

- Record Editor—a tool that builds new table definitions to add, drop or modify files in existing tables and support filed editing;

- PeopleCode—an extension to the Record Editor that is a simple programming language used for custom field-level calculations, edits, defaults and routines;

- Panel Editor—builds a GUI-based query and data entry screens or modifies existing screens;

- Menu Editor—builds or modifies pull-down menus;

- Operator Security Editor—controls the scope and level of data accessibility;

- Help Editor—-creates and modifies on-line help text;

- Import Utility—speeds the loading of data generated by other systems into the RDBMS server;

- Upgrade Manager—supports customer upgrades to successive versions of PeopleTools applications while retaining all functionality and feature modifications made by the customer;

- Object Security Manager—used to allow read or modification access to individual objects and groups of objects, including records, panels, menus or tree structures;

- Tree Editor-an end—user editor that builds hierarchical relationships between different data elements within a given table;

- PS/nVision—an end-user tool designed for PS/GL and ultimately PS/HRMS, to produce financial statements, responsibility reports and other ad hoc reports and analyses.

Professional Services:
PeopleSoft provides support services to its clients, including software installation, customer training classes and hotline support. Fee-based consulting services for assistance in system implementations and annual system audits are also available.

g. Industry Markets

PeopleSoft primarily targets Fortune 1000 companies and medium-sized organization or divisions requiring enterprise-level software applications. The product lines offered are cross-industry applications.

With the introduction of financial applications, PeopleSoft hopes to become a leader in financial business application software products using graphical user interface, relational databases and client/server technology.

h. Clients

The following companies are PeopleSoft application clients:

PeopleSoft HRMS:

Alberta Energy Company, Ltd, American Family Insurance Group, American General Corporation, Anadarko Petroleum Corporation, ASARCO, Inc., AT&T, BP Chemicals, The Canada Council, Capital Cities/ABC, Continental Grain, Delmarva Power & Light Company, Honeywell, Kmart Corporation, Kellogg Canada, Lubrizol Corporation, Mead Data Central, Monsanto Corporation, Quaker Oats, the State of Delaware, Swiss Bank Corporation, Taco Bell, Turner Corporation, The Washington Post, Western Michigan University.

PeopleSoft Financials:

Alcoa U.S.A., Alcoa of Australia, Calgary General Hospital, Goldman Sachs & Co., IDS Financial Corporation, Liquor Distribution Branch of British Columbia, McKee Foods, National Association of Securities Dealers, NCR, Ontario Hydro, Virginia Farm Bureau.

i. Geographic Markets

INPUT estimates that 95% of PeopleSoft's 1992 revenue came from North American sales and the remaining 5% from international sales.

5. SAP America, Inc.

International Court One
100 Stevens Drive
Philadelphia, PA 19113
Phone: (215) 521-4500
Fax: (215) 521-6290
President: Klaus P. Besier
Status: Subsidiary
Parent: SAP AG
Total Employees: 350
Total Revenue: $54 million
Fiscal Year End: 12/31/92

a. Key Points

- SAP America (SAP) delivered its client/server-based application to market three months ahead of schedule. SAP effectively beat a key competitor to market, offering its client/server application software, R/3.

- The R/3 product positions SAP America to compete in the burgeoning market of client/server software running on midrange relational technology supporting databases.

- SAP America is positioned in the client/server-based financial applications, materials management, sales and distribution and human resources applications markets.

- SAP America's R/3 was chosen in an informal poll of Information Week readers as one of the best products of 1992.

b. Company Description

SAP America, Inc. markets and supports the mainframe-based R/2 system and the client/server-based R/3 system, fully integrated enterprise-wide applications software systems designed to integrate the information needs of Fortune 500 companies.

c. Strategy

SAP's challenges are to:

- Expand its international coverage and customer base;
- Exploit opportunities in the United States and Eastern Europe;
- Introduce new product ranges offering greater portability and distributed computing;
- Extend market coverage to small and medium-sized organizations.

To address the needs of large and midsized corporations that require integrated applications systems using an open systems, client/server strategy, SAP announced the R/3 System in 1992. Moreover, R/2 and R/3 can run concurrently and can be integrated to optimize both environments.

- Like the R/2 System, the R/3 System provides a range of on-line, real-time, integrated business applications. Also like R/2, R/3 customers can address specific applications needs while laying the foundation for a single, enterprise-wide strategy.
- The product is available in Europe and in North America. R/3 supports UNIX environments on IBM, Hewlett-Packard, DEC, Siemens-Nixdorf, and Bull platforms. R/3 will support Windows NT in 1994.

d. Competitors

SAP America competitors include American Software, Computer Associates, D&B Software, Oracle and Walker Interactive.

e. Key Products and Services

One hundred percent of SAP America's 1992 revenue was derived from applications software products and associated support services.

R/2 System
The R/2 System is an integrated set of 10 business applications modules that manage a range of strategic business applications for data-intensive corporations with numerous locations and operations.

- The R/2 System runs on IBM 370 and compatible mainframes.
- The core of the R/2 System is the Basis System, which contains development tools for the system and provides interface capabilities that allow users to access database information in any module from anywhere in the company.

- R/2 System modules include:
  - RF: Financial Accounting;
  - FA: Fixed Assets;
  - RK: Cost Accounting;
  - RK-P: Project Planning and Control;
  - RV: Sales;
  - RM-PPS: Production Planning and Control;
  - RM-MAT: Material Management;
  - RM-QSS: Quality Assurance;
  - RM-INST: Plant Maintenance;
  - RP: Personnel Management.

- Modules are available and priced separately. Pricing on the Basis System starts at $100,000, depending on the configuration.

R/3 System

The R/3 System is an integrated set of business applications modules that work with client/server architecture to provide links between finance, manufacturing, human resource and sales and distribution applications. R/3 is based on SAP's earlier R/2 package and utilizes that product's functionality, interoperability and portability.

- The core of the R/3 System is the Basis System, which accesses SAP's development environment, data dictionary and customization and centralization tables.

- Version 1.1 of R/3 includes the following modules:
  - RF: Financial Accounting;
  - FA: Fixed Assets;
  - RK: Cost Accounting;
  - RK-P: Project Planning and Control;
  - RV: Sales;
  - RM-MAT: Material Management.

- Modules are available and priced separately. Pricing on the R/3 1.1 integrated software package starts at $50,000, depending on the configuration.

- R/3 2.0 was released by the third quarter of 1993.

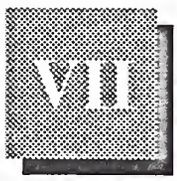
f. Alliances

SAP America has various strategic alliances/relationships with companies that augment its sales and support efforts in the U.S. SAP Alliance partners include Andersen Consulting, CAP Gemini America, Coopers & Lybrand, Computer Task Group, Deloitte & Touche, Electronic Data Systems, Ernst & Young, KMPG Peat Marwick and Price Waterhouse.

- SAP established two separate Centers of Expertise (COE), one with Price Waterhouse and one with Deloitte & Touche. The Centers of Excellence are joint service organizations with dedicated staff from both SAP and its joint venture partners. Both COEs support software implementations and provide a range of functional, technical and project management services.

g. Industry Markets

SAP America's revenue is derived from approximately 75 clients in various industries, including oil and gas, chemical, pharmaceutical, packaged goods, process manufacturing, discrete manufacturing, electronics, utilities and food industries.



Conclusions and Recommendations

A
Conclusions

INPUT has drawn a number of conclusions about the direction of the applications solutions markets based on an extensive review of secondary sources, interviews with IS decision makers and discussions with vendors serving these markets. These conclusions are listed in Exhibit VII-1 and are described in this chapter, along with relevant recommendations.

EXHIBIT VII-1

Conclusions

- Downsizing to a client/server environment is changing the applications solutions market
- Enterprise computing is the model for the 1990s
- The applications solution market will continue to grow, but individual vendor growth rates will be less constant
- "Solutions" selling will become increasingly necessary
- Applications solutions vendors will compete with other delivery modes
- Big vendors will keep getting bigger

This is the second major report INPUT has issued this year on the applications solutions market. Conclusions of the earlier report that are still valid are repeated in this report.

Downsizing to a Client/Server Environment Is Changing the Applications Solutions Market

A year ago it was not as evident as it is today how difficult times have become for many of the leading companies in the applications software products markets. Price declines have been steep, particularly in the PC applications products markets, with the beginnings of market saturation and increased competition, particularly evident in the bundling of applications solutions into product suites. In addition, the impact of the downsizing movement with emphasis on migrating applications to lower-cost platforms has negatively impacted the growth rate for many companies that traditionally served the minicomputer and mainframe-based applications solutions markets. A few companies in this group have done relatively well, which appears to tie in with their early-stage offerings of client/server product extensions. However, decision delays by potential customers on new product purchases also contributed negatively. There continues to be lack of client/server packaged solutions that would address enterprise computing, which would justify mainframe computer replacement.

Part of the problem relates to lack of strong systems management software solutions for distributed processing that can replicate the quality of systems management functions in the traditional mainframe and minicomputer environments. This is a principal reason why much of the client/server applications solutions product is still oriented toward decision support functionality and not OLTP-based solutions. This will change over time, but is making the move to client/server computing on lower-cost platforms more of an evolutionary one for many companies.

A second generation of client/server products expected from many companies in late 1994 and 1995 will emphasize distributed processing solutions for mission-critical applications.

Acceleration in the movement toward downsizing will be fueled by technology solutions that reduce the complexity of the process (particularly with more vendor consensus on de facto standards and with application development tools and incorporated object-oriented programming) and enhancement of systems management solutions for distributed applications. Many companies are developing sophisticated middleware and other application development frameworks that could greatly enhance productivity in a complex distributing processing environment. Ultimately, more consensus on de facto standards will be required for downsizing to a distributed, enterprise-wide computing environment to be more easily justified on a competitive cost basis versus many of the traditional, hierarchical computing solutions.

Enterprise Computing is the Model for the 1990s

While the mainframe and midrange systems traditionally controlled mission-critical applications, the PC was the domain of personal productivity and analysis tools. Today, with the trend toward downsizing, often referred to as "right-sizing," (which refers to making use of all three of these platforms), the goal is to use hardware that is most functional for a particular application. This is enhanced by linking these platforms through networks and with integrated relational database management systems.

As companies downsize and move toward distributed processing, they are in the early stages of evaluating the client/server architecture, where applications processing and storage are shared between client devices (such as PCs) and a server. Although the move toward client/server is just beginning, the majority of executives interviewed by INPUT expect to implement this architecture by 1998. The end result should be positive for the applications solutions market over the next few years, but reduced pricing for hardware and packaged software (with lower-priced platforms) will require vendors to place much more emphasis on services such as consulting, applications development, outsourcing, systems integration and education and training.

Continued Growth Expected in Applications Solutions Market, But There Will be Less Consistent Growth Among Vendors

INPUT forecasts continuing growth of 15%, compounded annually, over the next five years for the applications software products market. This compares with a 14% growth rate in 1992 and a projected 12% annual growth rate in 1993. Acceleration in the growth rate forecast for the applications software products markets over the next few years is based on INPUT's assessment of the near-term positive impact from new market opportunities provided by the client/server computer paradigm shift and an eventual shift to open systems, based on applications interoperability.

The turnkey system market is forecasted to grow at a CAGR of 8% over the next five years. Declining profitability in the hardware component of the turnkey solution will require vendors to place more emphasis on professional services to maintain their growth rates.

Combined turnkey systems and applications software product (applications solutions) markets are forecasted to grow at a 13% CAGR, slightly above INPUT's forecast of a 12% CAGR for the total U.S. Information Services Market between 1993 and 1998. The fastest growing delivery modes are projected to be systems operations (outsourcing) at 16% and network services at 17%, which includes electronic information services, and network applications.

Solutions Selling is Necessary to Be Competitive

Product vendors must migrate to providing services to remain competitive in the applications solutions market.

Distributing processing greatly increases the complexity of applications solutions. As a result, many IS departments and end-user departments don't have the staffing and budget resources to keep up with changing demands. As a result, they will look more to third-party applications solutions vendors for a broader base of both product and services to implement newer, distributed operations. This requires applications solutions providers to expand their own product and services offerings.

Applications Solutions Vendors Will Compete with Other Delivery Modes

As vendors become more service-oriented, it will become increasingly difficult to differentiate software companies from systems integrators and professional services companies.

Applications software solutions vendors should partner with companies whose strengths are in complementary delivery modes, particularly companies that specialize in consulting, systems development tools and systems integration.

Applications solutions selling will look more like old-fashioned turnkey systems solutions, but based more on product sharing from a number of partners. The value added will be in application development, product maintenance and related complementary services. Probably the best positioned companies to deliver such "turnkey/VAR" solutions are the computer systems, systems software and systems integration companies.

Big Vendors Keep Getting Bigger

In an industry where small companies are still prevalent, the leaders are achieving dominance, affecting the ability of smaller vendors to compete.

Large vendors will continue to gain market share over the next few years, both from mergers and acquisitions and from penetrating larger available markets, with their substantial technical and financial resources.

Smaller companies must address niche markets or align themselves with other, more dominant vendors with complementary products.

B
Recommendations

Vendor recommendations are outlined in Exhibit VII-2 and briefly discussed below.

EXHIBIT VII-2

Recommendations

- Work within a total solutions product architecture
- Re-evaluate market sector emphasis
- Offer flexible pricing
- Form strategic alliances
- Support standards

Work Within a Total Solutions Product Architecture

As IS budgets shrink, companies will look outside to handle industry-specific needs that previously were developed internally. Because companies believe that many of these needs are unique, they will want to do business with third parties that understand their needs from a business perspective. If applications solutions vendors cannot provide the level of business/technology understanding required, they should partner with companies in complementary product delivery areas.

In particular, computer systems and systems software (application development tools) vendors could be strong partners, because they provide the interconnectivity/operability requirements across platforms in a distributed processing environment. In time, computer systems and systems software companies should reverse traditional marketing approaches somewhat. Instead of reference-selling their products through VARs, computer systems and systems software (application development tools) vendors should become the new turnkey systems/VARs by combining software and industry expertise from third parties and reselling the combined product in a total solutions offering. Oracle Industries is a model for such a new marketing approach.

This new turnkey systems/VAR approach will provide customizable products, based on industry-specific application development templates. 80% of the solution should be replicatable from customer to customer to simplify application development and maintenance elements, and the other 20% customized to particular customers. Knowledge-based programming and object-oriented application development tools greatly enhances productivity benefits of this approach. More emphasis should be placed on obtaining application development as an outsourcing business, including maintenance. Maintenance, however, must be priced as a professional service.

Re-evaluate Market Sector Emphasis

Vertical market expertise will become increasingly important. Industry-knowledgeable people should be hired to sell to the targeted markets.

Strength in application development tool technology will become more important because product customization can be much more of a requirement in addressing industry-specific markets than for cross-industry markets.

Re-engineering consulting skills must be provided, and process management/workflow software applications must be integrated into traditional vertical market solutions to provide enterprise-wide applications solutions.

Vendors are under pressure not only to have better products, but also to be better sales professionals. They must listen carefully to the needs of their customers and become much more solutions-oriented. Provision of high-quality education, service and support—or aligning with a company that can provide these—will be critical to success.

Offer Flexible and Competitive Pricing

Buyers have already rebelled against traditional tiered pricing structures.

Pricing is a complex issue today as new technologies and changes make old pricing structures inequitable. Vendors need to continually re-evaluate their approach to pricing to stay competitive and achieve adequate profit margins.

In the future, emphasis in pricing will be flexibility. Buyers want the option to buy or lease. For some applications, usage-sensitive pricing will be an attractive option. Still other buyers will want to take advantage of bundled software as part of hardware purchases.

Vendors, however, must also re-think pricing based on comparisons with internal development costs. Professional services pricing must be based on the value-added capability of providing application and maintenance more cheaply than in-house developers. The benchmarks established need to be different from those for standard, packaged software.

In particular, as client/server technology increases in use, pricing schemes must be developed to operate in this environment.

Sensitivity to end-user needs will be critical in successful pricing strategies.

Form Strategic Alliances

Given the trend toward applications downsizing along with application integration, vendors in the 1990s will sell to a diverse customer set that includes various departmental managers as well as centralized IS managers. Vendors must, therefore, be credible to a variety of customers at tactical and strategic levels. As the ultimate corporate IS goal is enterprise-wide computing, vendors must be perceived as able to meet multiple needs within a corporation.

In order to meet these needs, vendors must form alliances with firms that have expertise they lack. Alliances are particularly important for the success of smaller niche vendors, which may lack the marketing abilities to go it alone.

Even market leaders are not able to provide across-the-board solutions to their customers. The buyer does not want to function as a project manager responsible for integrating multiple vendor products. IT vendors must provide this role in the future, offering an advantage to those with systems integration capabilities.

As traditional applications markets mature, vendors must diversify their product offerings to meet more sophisticated needs. Acquisitions and strategic partnerships present ways to diversify to offer appropriate customer solutions.

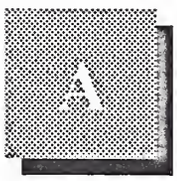
Support Standards as Developed

In this fast-changing industry, it has been difficult to develop true standards. While both users and vendors recognized and moved toward standards and open systems, it has been a slow process, complicated by the myriad of new product introductions that have taken place along the way.

Vendors need to be aware of *de facto* standards as they develop and be ready to offer products that conform to those standards.

Buyers today seek solutions that will work on multiple platforms and operating systems. Product standardization will make it easier for buyers to use technology as a tool to support their businesses while insulating them from the technical aspects of computer systems.

In order to support a multivendor and multiplatform strategy, turnkey vendors must either diminish reliance on hardware or support a broad range of hardware platforms. Vendors are under increasing pressure to open up their systems. Customers may want turnkey solutions, but they don't want to be "locked" into what they perceive to be "proprietary solutions" versus "open systems" alternatives.



Definition of Terms

A
Introduction

INPUT's *Definition of Terms* provides the framework for all of INPUT's market analyses and forecasts of the information services industry. It is used for all U.S. programs. The structure defined in Exhibit A-1 is also used in Europe and for the worldwide forecast.

One of the strengths of INPUT's market analysis services is the consistency of the underlying market sizing and forecast data. Each year INPUT reviews its industry structure and makes changes if they are required. When changes are made they are carefully documented and the new definitions and forecasts reconciled to the prior definitions and forecasts. INPUT clients have the benefit of being able to track market forecast data from year to year against a proven and consistent foundation of definitions.

B
Overall Definitions and Analytical Framework

1. Information Services

Information Services are computer/telecommunications-related products and services that are oriented toward the development or use of information systems. Information services typically involve one or more of the following:

- Use of vendor-provided computer processing services to develop or run applications or provide services such as disaster recovery or data entry (called *Processing Services*)
- A combination of computer equipment, packaged software and associated support services which will meet an application systems need (called *Turnkey Systems*)

- Packaged software products, including systems software or applications software products (called *Software Products*)
- People services that support users in developing and operating their own information systems (called *Professional Services*)
- The combination of products (software and equipment) and services where the vendor assumes total responsibility for the development of a custom integrated solution to an information systems need (called *Systems Integration*)
- Services that provide operation and management of all or a significant part of a user's information systems functions under a long-term contract (called *Systems Operations*)
- Services that support the delivery of information in electronic form—typically network-oriented services such as value-added networks, electronic mail and document interchange (called *Network Applications*)
- Services that support the access and use of public and proprietary information such as on-line databases and news services (called *Electronic Information Services*)
- Services that support the operation of computer and digital communication equipment (called *Equipment Services*)

In general, the market for information services does not involve providing equipment to users. The exception is where the equipment is part of an overall service offering such as a turnkey system, a systems operations contract or a systems integration project.

The information services market also excludes pure data transport services (i.e., data or voice communications circuits). However, where information transport is associated with a network-based service (e.g., electronic data interchange services), or cannot be feasibly separated from other bundled services (e.g., some systems operations contracts), the transport costs are included as part of the services market.

The analytical framework of the information services industry consists of the following interacting factors: overall and industry-specific business environment (trends, events and issues); technology environment; user information system requirements; size and structure of information services markets; vendors and their products, services and revenues; distribution channels; and competitive issues.

2. Market Forecasts/User Expenditures

All information services market forecasts are estimates of *User Expenditures* for information services. When questions arise about the proper place to count these expenditures, INPUT addresses them from the user's viewpoint: expenditures are categorized according to what users perceive they are buying.

By focusing on user expenditures, INPUT avoids two problems which are related to the distribution channels for various categories of services:

- Double-counting, which can occur by estimating total vendor revenues when there is significant reselling within the industry (e.g., software sales to turnkey vendors for repackaging and resale to end users)

- Missed counting, which can occur when sales to end users go through indirect channels such as mail order retailers

Captive Information Services User Expenditures are expenditures for products and services provided by a vendor that is part of the same parent corporation as the user. These expenditures are not included in INPUT forecasts.

Noncaptive Information Services User Expenditures are expenditures that go to vendors that have a different parent corporation than the user. It is these expenditures which constitute the information services market analyzed by INPUT and that are included in INPUT forecasts.

3. Delivery Modes

Delivery Modes are defined as specific products and services that satisfy a given user need. While *Market Sectors* specify *who* the buyer is, *Delivery Modes* specify *what* the user is buying.

Of the nine delivery modes defined by INPUT, six are considered primary products or services:

- Processing Services
- Network Services
- Professional Services
- Applications Software Products
- Systems Software Products
- Equipment Services

The remaining three delivery modes represent combinations of these products and services, combined with equipment, management and/or other services:

- Turnkey Systems
- Systems Operations
- Systems Integration

Section C describes the delivery modes and their structure in more detail.

4. Market Sectors

Market Sectors or markets are groupings or categories of the buyers of information services. There are three types of user markets:

- *Vertical Industry* markets, such as Banking, Transportation, Utilities, etc. These are called "industry-specific" markets.

- *Functional Application* markets, such as Human Resources, Accounting, etc. These are called "cross-industry" markets.

- *Other* markets, which are neither industry- nor application-specific, such as the market for systems software products and much of the on-line database market.

Specific market sectors used by INPUT are defined in Section E, below.

5. Trading Communities

Information technology is playing a major role in re-engineering, not just companies but the value chain or *Trading Communities* in which these companies operate. This re-engineering is resulting in electronic commerce emerging where interorganizational electronic systems facilitate the business processes of the trading community.

- A trading community is the group or organizations—commercial and noncommercial—involved in producing goods or services.

- Electronic commerce and trading communities are addressed in INPUT's EDI and Electronic Commerce Program.

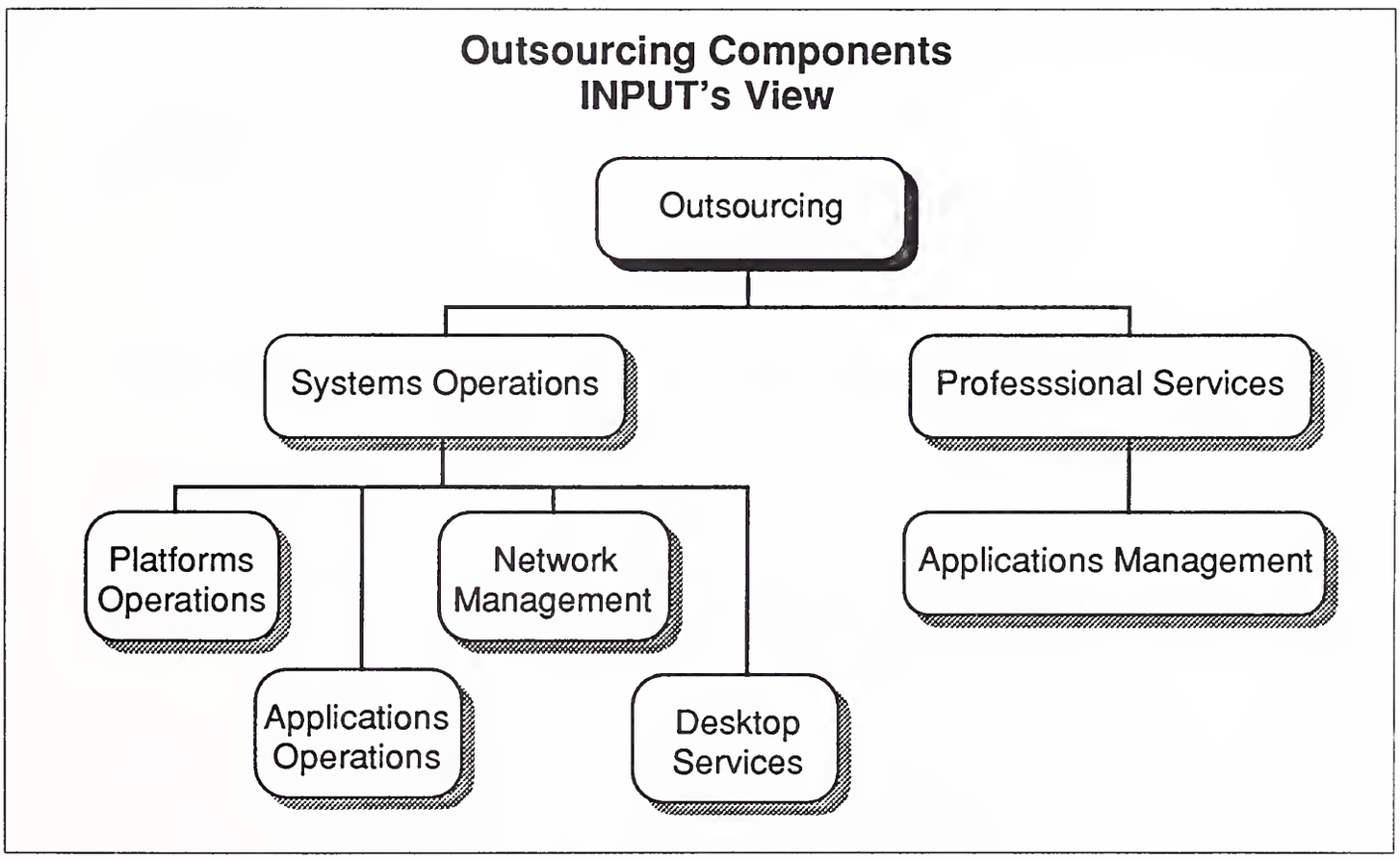
6. Outsourcing

Over the past few years a major change has occurred in the way clients are buying some information services. The shift has been labeled *outsourcing*.

INPUT views outsourcing as a change in the form of the client/vendor relationship. Under an outsourcing relationship, all or a major portion of the information systems function is contracted to a vendor in a long-term relationship. The vendor is responsible for the performance of the function.

INPUT considers the following submodes to be outsourcing-type relationships and in aggregate to represent the outsourcing market. See Exhibit A-1. Complete definitions are provided in Section C of this document. INPUT provides these forecasts as part of the corresponding delivery modes.

EXHIBIT A-1



- *Platform Systems Operations* - The vendor is responsible for managing and operating the client's computer systems.

- *Applications System Operations* - The vendor is responsible for developing and/or maintaining a client's applications as well as operating the computer systems.

- *Network Management* - The vendor assumes full responsibility for operating and managing the client's data communications systems. This may also include the voice communications of the client.

- *Applications Management/Maintenance* - The professional services vendor has full responsibility for developing and/or maintaining some or all of the applications systems that a client uses to support business operations. The services are provided on a long-term contractual basis.

- *Desktop Services* - The vendor assumes responsibility for the deployment, maintenance, and connectivity between the personal computers and/or intelligent workstations in the client organization. The services may also include performing the help-desk function. The services are provided on a long-term contractual basis.

C
Delivery Modes and Submodes

Exhibit A-2 provides the overall structure of the information services industry as defined and used by INPUT. This section of *Definition of Terms* provides definitions for each of the delivery modes and their submodes or components.

1. Software Products

INPUT divides the software products market into two delivery modes: systems software and applications software.

The two delivery modes have many similarities. Both involve purchases of software packages for in-house computer systems. Included are both lease and purchase expenditures, as well as expenditures for work performed by the vendor to implement or maintain the package at the user's sites. Vendor-provided training or support in operation and use of the package, if part of the software pricing, is also included here.

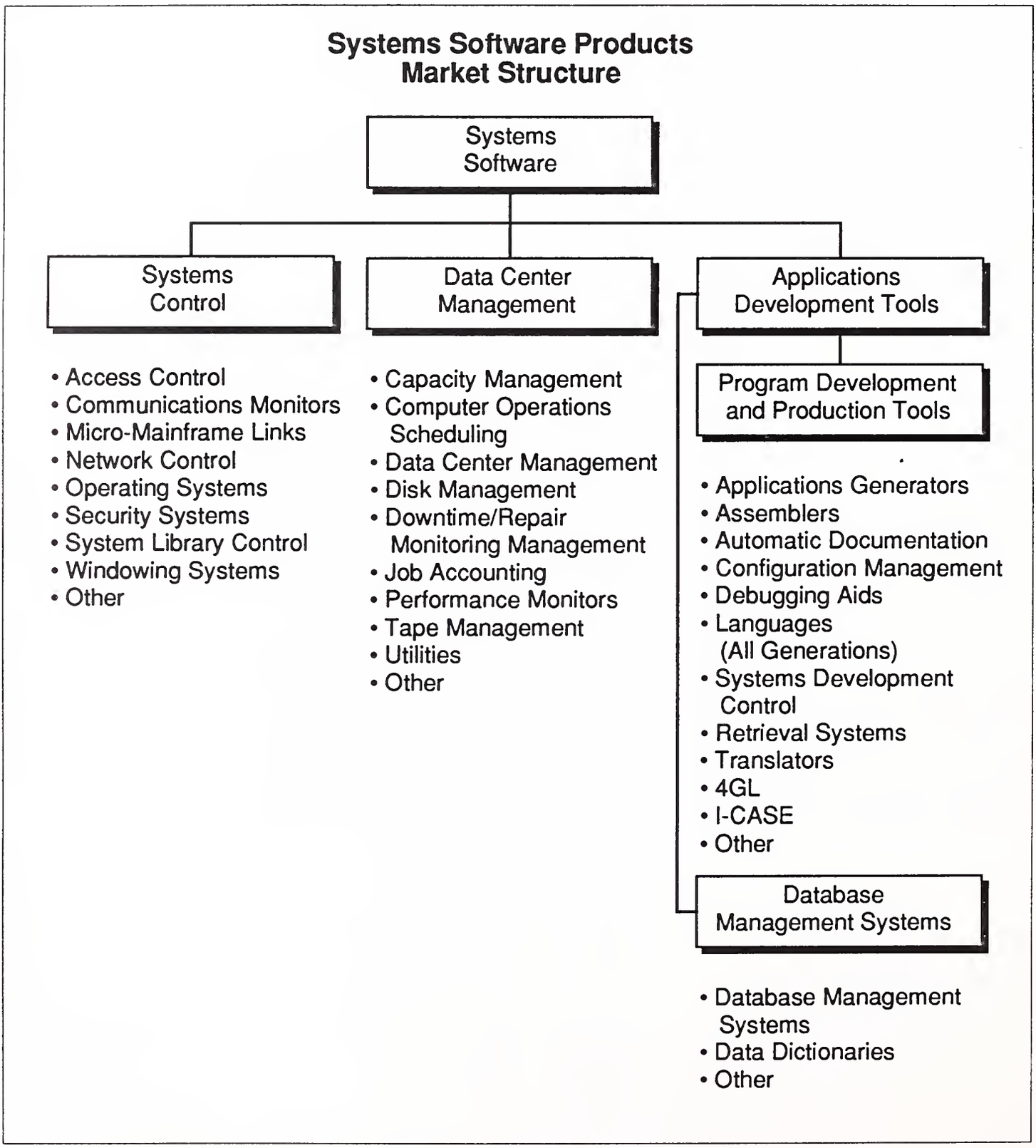
Expenditures for work performed by organizations other than the package vendor are counted in the professional services delivery mode. Fees for work related to education, consulting, and/or custom modification of software products are also counted as professional services, provided such fees are charged separately from the price of the software product itself.

EXHIBIT A-2

a. Systems Software Products

Systems software products enable the computer/communications system to perform basic machine-oriented or user interface functions. INPUT divides systems software products into three submodes. See Exhibit A-3.

EXHIBIT A-3



- *Systems Control Products* - Software programs that manage computer system resources and control the execution of programs. These products include operating systems, emulators, network control, library control, windowing, access control and spoolers.

- *Operations Management Tools* - Software programs used by operations personnel to manage the computer system and/or network resources and personnel more effectively. Included are performance measurement, job accounting, computer operation scheduling, disk management utilities and capacity management.

- *Applications Development Tools* - Software programs used to prepare applications for execution by assisting in designing, programming, testing, and related functions. Included are traditional programming languages, 4GLs, data dictionaries, database management systems, report writers, project control systems, CASE systems and other development productivity aids.

INPUT also forecasts the systems software products delivery mode by platform level: mainframe, minicomputer and workstation/PC.

b. Applications Software Products

Applications software products enable a user or group of users to support an operational or administrative process within an organization. Examples include accounts payable, order entry, project management and office systems. INPUT categorizes applications software products into two groups of market sectors. (See Exhibit A-4.)

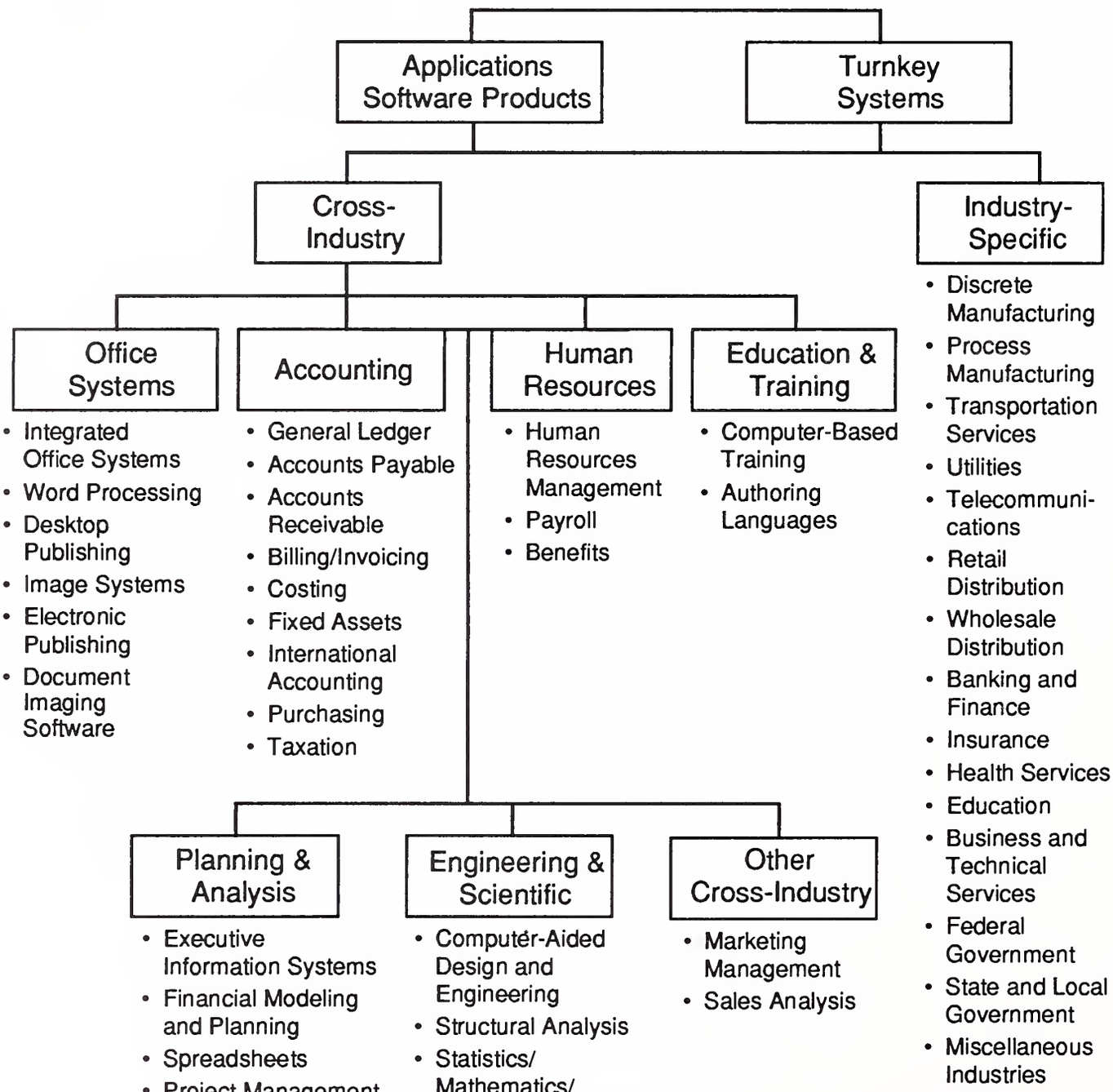
- *Industry Applications Software Products* - Software products that perform functions related to fulfilling business or organizational needs unique to a specific industry (vertical) market and sold to that market only. Examples include demand deposit accounting, MRPII, medical record keeping, automobile dealer parts inventory, etc.

- *Cross-Industry Applications Software Products* - Software products that perform a specific function that is applicable to a wide range of industry sectors. Examples include payroll and human resource systems, accounting systems, word processing and graphics systems, spreadsheets, etc.

INPUT also forecasts the applications software products delivery mode by platform level: mainframe, minicomputer and workstation/PC.

EXHIBIT A-4

Applications Products and Turnkey Systems



2. Turnkey Systems

A turnkey system is an integration of equipment (CPU, peripherals, etc.), systems software, and packaged applications software into a single product developed to meet a specific set of user requirements. Value added by the turnkey system vendor is primarily in the software and professional services provided. INPUT categorizes turnkey systems into two groups of market sectors as it does for applications software products. (See Exhibit A-4.)

Most CAD/CAM systems and many small business systems are turnkey systems. Turnkey systems utilize standard computers and do not include specialized hardware such as word processors, cash registers, process control systems or embedded computer systems for military applications.

Computer manufacturers (e.g., IBM or DEC) that combine software with their own general-purpose hardware are not classified by INPUT as turnkey vendors. Their software revenues are included in the appropriate software category.

Most turnkey systems are sold through channels known as value-added resellers.

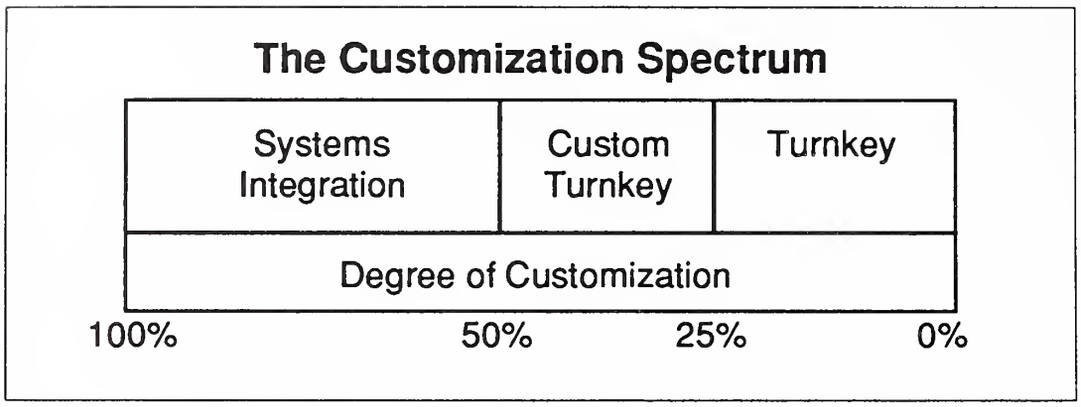
- *Value-Added Reseller (VAR):* A VAR adds value to computer hardware and/or software and then resells it to an end user. The major value added is usually applications software for a vertical or cross-industry market, but also includes many of the other components of a turnkey systems solution, such as professional services, software support, and applications upgrades.

Turnkey systems have three components:

- Equipment - computer hardware supplied as part of the turnkey system
- Software products - prepackaged systems and applications software products
- Professional services - services to install or customize the system or train the user, provided as part of the turnkey system sale

Exhibit A-5 contrasts turnkey systems with systems integration. Turnkey systems are based on available software products that a vendor may modify to a modest degree.

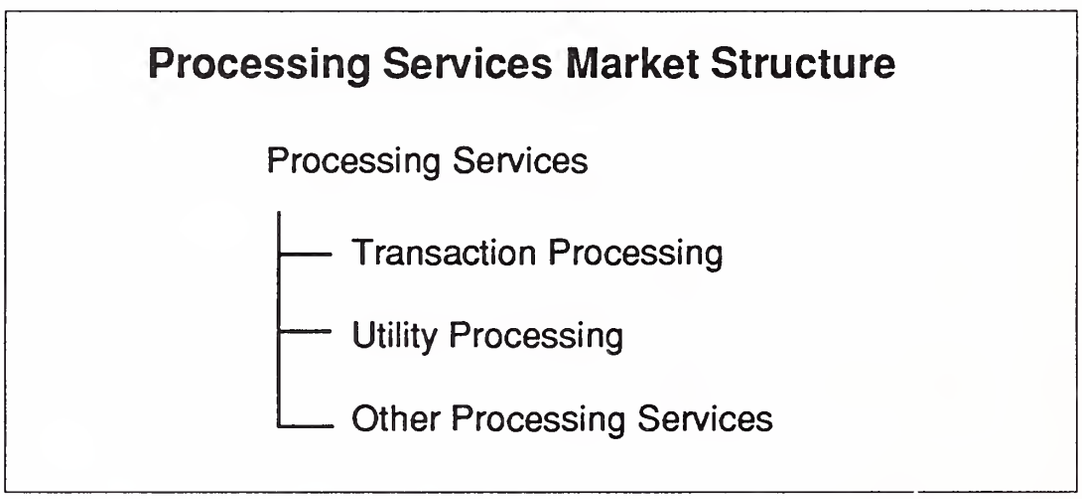
EXHIBIT A-5



3. Processing Services

This delivery mode includes three submodes: transaction processing, utility processing, and "other" processing services. See Exhibit A-6.

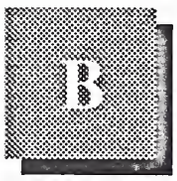
EXHIBIT A-6



- *Transaction Processing* - Client uses vendor-provided information systems—including hardware, software and/or data networks—at the vendor site or customer site to process specific applications and update client databases. The application software is typically provided by the vendor.

- *Utility Processing* - Vendor provides basic software tools (language compilers, assemblers, DBMSs, graphics packages, mathematical models, scientific library routines, etc.), enabling clients to develop and/or operate their own programs or process data on the vendor's system.

- *Other Processing Services* - Vendor provides service—usually at the vendor site—such as scanning and other data entry services, laser printing, computer output microfilm (COM), CD preparation and other data output services, backup and disaster recovery, etc.



Forecast Database

A

Forecast Database

Exhibits B-1 through B-6 present the detailed 1993-1998 forecast for applications software products and turnkey systems. The forecasts by presented by platform size and submode and by market sector.

EXHIBIT B-1

Applications Software Products and Turnkey Systems—Forecast by Platform Size and Submode, 1992-1998

Delivery Modes	1992 ($M)	Growth 92-93 (%)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	1997 ($M)	1998 ($M)	CAGR 93-98 (%)
Sector Total	33,846	12	37,803	42,211	47,548	53,423	60,381	68,335	13
Turnkey Systems	12,265	11	13,627	14,761	15,996	17,356	18,852	20,484	8
- Equipment	5,474	7	5,873	6,192	6,519	6,799	7,195	7,601	5
- Software Products	4,582	13	5,178	5,660	6,223	6,818	7,489	8,185	10
- Applications Software	3,897	14	4,441	4,883	5,397	5942	6,551	7,192	10
- Systems Software	685	8	737	777	826	876	938	993	6
- Professional Services	2,209	17	2,576	2,909	3,254	3,739	4,168	4,698	13
Applications Software	21,581	12	24,176	27,450	31,552	36,067	41,529	47851	15
- Mainframe	5,247	7	5,598	5,986	6,405	6,814	7,221	7,670	7
- Minicomputer	5,859	8	6,347	6,902	7,501	8,138	8,823	9,562	9
- Workstation/PC	10475	17	12,231	14,562	17,646	21,115	25,485	30,619	20

EXHIBIT B-2

Applications Software Products—Forecast by Market Sector, 1992-1998

Market Sectors	1992 ($M)	Growth 92-93 (%)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	1997 ($M)	1998 ($M)	CAGR 93-98 (%)
Total All Sectors	21,582	12	24,176	27,449	31,552	36,067	41,529	47,851	15
Vertical Industry Markets	12,025	12	13,479	15,350	17,709	20,340	23,639	27,483	15
Discrete Manufacturing	2,285	18	2,695	3,209	3,864	4,703	5,789	7,201	22
Process Manufacturing	683	16	793	916	1,068	1,149	1,466	1,728	17
Transportation	425	11	472	538	615	688	786	904	14
Utilities	224	15	257	292	330	369	417	470	13
Telecommunications	411	19	490	586	701	842	1,010	1,217	20
Retail Distribution	302	13	342	387	436	493	557	630	13
Wholesale Distribution	585	12	653	733	832	954	1,098	1,284	14
Banking and Finance	2,122	11	2,366	2,611	2,871	3,139	3,425	3,744	10
Insurance	891	11	993	1,118	1,270	1,448	1,681	1,966	15
Health Services	1,110	10	1,219	1,390	1,665	1,949	2,193	2,430	15
Education	745	11	825	923	1,035	1,165	1,306	1,447	12
Business Services	1,021	16	1,182	1,387	1,638	1,947	2,319	2,771	19
Federal Government	774	-10	693	703	764	806	827	851	4
State & Local Government	190	15	219	251	286	323	360	394	12
Miscellaneous Industries	257	9	280	306	334	365	405	446	10
Cross-Industry Markets	9,557	12	10,697	12,099	13,843	15,727	17,890	20,368	14
Accounting	2,666	11	2,954	3,308	3,740	4,261	4,884	5,612	14
Education and Training	221	6	235	260	285	317	350	383	10
Engineering and Scientific	735	11	817	910	1,025	1,147	1,294	1,465	12
Human Resources	763	11	848	951	1,060	1,215	1,400	1,610	14
Office Systems	2,897	10	3,198	3,594	4,138	4,579	5,031	5,430	11
Planning and Analysis	1,915	18	2,255	2,645	3,115	3,675	4,340	5,210	18
Sales and Marketing	360	8	390	431	480	533	591	658	11

EXHIBIT B-3

Mainframe Applications Software Products
U.S. Market Forecast by Market Sector, 1992-1998

Market Sectors	1992 ($M)	Growth 92-93 (%)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	1997 ($M)	1998 ($M)	CAGR 93-98 (%)
Total All Sectors	5,247	7	5,598	5,986	6,405	6,814	7,221	7,670	7
Vertical Industry Markets	3,331	6	3,541	3,780	4,047	4,308	4,559	4,847	6
Discrete Manufacturing	390	5	410	431	452	475	498	523	5
Process Manufacturing	178	8	192	203	214	225	235	245	5
Transportation	150	3	155	163	170	178	186	194	5
Utilities	50	10	55	59	63	67	73	79	8
Telecommunications	199	15	229	263	303	348	400	460	15
Retail Distribution	50	6	53	56	59	61	65	65	4
Wholesale Distribution	252	4	262	271	280	288	296	304	3
Banking and Finance	935	11	1,042	1,150	1,260	1,360	1,460	1,563	8
Insurance	329	6	350	368	394	421	455	495	7
Health Services	385	6	408	432	462	485	504	524	5
Education	83	2	85	86	88	89	91	93	2
Business Services	117	2	119	121	123	125	127	129	2
Federal Government	139	-25	104	98	99	105	89	94	-2
State & Local Government	60	7	64	67	69	70	70	70	2
Miscellaneous Industries	14	-7	13	12	11	11	10	9	-7
Cross-Industry Markets	1,916	7	2,057	2,206	2,358	2,506	2,662	2,823	7
Accounting	853	9	930	1,013	1,100	1,193	1,289	1,392	8
Education and Training	55	2	56	56	57	58	59	60	1
Engineering and Scientific	160	8	172	185	200	212	224	240	7
Human Resources	278	5	293	308	325	340	360	378	5
Office Systems	162	1	163	164	163	159	151	140	-3
Planning and Analysis	210	12	235	260	280	300	325	350	8
Sales and Marketing	198	5	208	220	233	244	254	263	5

EXHIBIT B-4

Minicomputer Applications Software Products
U.S. Market Forecast by Market Sector, 1992-1998

Market Sectors	1992 ($M)	Growth 92-93 (%)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	1997 ($M)	1998 ($M)	CAGR 93-98 (%)
Total All Sectors	5,859	8	6,347	6,901	7,501	8,138	8,823	9,561	9
Vertical Industry Markets	3,783	9	4,130	4,530	4,970	5,434	5,941	6,498	9
Discrete Manufacturing	1,145	11	1,275	1,415	1,571	1,744	1,936	2,148	11
Process Manufacturing	230	13	260	293	326	365	409	458	12
Transportation	110	11	122	135	150	160	170	180	8
Utilities	69	12	77	86	95	102	114	126	10
Telecommunications	100	21	121	148	180	220	268	330	22
Retail Distribution	135	12	151	166	182	200	226	240	10
Wholesale Distribution	135	10	149	163	177	191	204	215	8
Banking and Finance	675	11	752	825	902	987	1,082	1,186	10
Insurance	125	2	128	132	135	138	142	148	3
Health Services	310	6	330	358	383	409	434	456	7
Education	182	7	194	210	226	241	255	269	7
Business Services	234	9	255	276	296	317	341	367	8
Federal Government	201	-14	173	169	183	185	174	179	1
State & Local Government	40	13	45	50	56	63	71	79	12
Miscellaneous Industries	92	7	98	104	108	112	115	117	4
Cross-Industry Markets	2,076	7	2,217	2,371	2,531	2,704	2,882	3,063	7
Accounting	666	6	706	752	805	865	930	995	7
Education and Training	27	4	28	29	29	30	30	31	2
Engineering and Scientific	265	9	290	315	345	375	410	445	9
Human Resources	273	7	293	319	345	375	400	432	8
Office Systems	590	8	635	680	725	770	815	860	6
Planning and Analysis	175	3	180	185	185	185	185	180	0
Sales and Marketing	80	6	85	91	97	104	112	120	7

EXHIBIT B-5

Workstation/PC Applications Software Products
U.S. Market Forecast by Market Sector, 1992-1998

Market Sectors	1992 ($M)	Growth 92-93 (%)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	1997 ($M)	1998 ($M)	CAGR 93-98 (%)
Total All Sectors	10,475	17	12,231	14,562	17,646	21,115	25,485	30,619	20
Vertical Industry Markets	4,911	18	5,808	7,041	8,692	10,599	13,139	16,137	23
Discrete Manufacturing	750	35	1,010	1,364	1,841	2,485	3,355	4,529	35
Process Manufacturing	275	24	341	420	528	559	822	1,025	25
Transportation	165	18	195	240	295	350	430	530	22
Utilities	105	19	125	147	172	200	230	265	16
Telecommunications	112	25	140	175	218	274	342	427	25
Retail Distribution	117	18	138	165	195	232	266	325	19
Wholesale Distribution	198	22	242	299	375	475	598	765	26
Banking and Finance	512	12	572	636	709	792	883	995	12
Insurance	437	18	515	618	741	889	1,084	1,323	21
Health Services	415	16	481	600	820	1,055	1,255	1,450	25
Education	480	14	546	627	721	835	960	1085	15
Business Services	670	21	808	990	1,219	1,505	1,851	2,275	23
Federal Government	434	-4	416	436	482	516	564	578	7
State & Local Government	90	22	110	134	161	190	219	245	17
Miscellaneous Industries	151	12	169	190	215	242	280	320	14
Cross-Industry Markets	5,564	15	6,423	7,521	8,954	10,516	12,346	14,482	18
Accounting	1,146	15	1,318	1,542	1,835	2,202	2,665	3,225	20
Education and Training	139	9	151	175	199	229	261	292	14
Engineering and Scientific	310	15	355	410	480	560	660	780	17
Human Resources	212	24	262	324	390	500	640	800	25
Office Systems	2,145	12	2,400	2,750	3,250	3,650	4,065	4,430	13
Planning and Analysis	1,530	20	1,840	2,200	2,650	3,190	3,830	4,680	21
Sales and Marketing	82	18	97	120	150	185	225	275	23

EXHIBIT B-6

Turnkey Systems—U.S. Market Forecast by Market Sector, 1992-1998

Market Sectors	1992 ($M)	Growth 92-93 (%)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	1997 ($M)	1998 ($M)	CAGR 93-98 (%)
Total All Sectors	12,265	11	13,627	14,761	15,996	17,355	18,853	20,484	8
Vertical Industry Markets	11,008	12	12,315	13,395	14,574	15,876	17,318	18,896	9
Discrete Manufacturing	2,940	11	3,269	3,640	4,062	4,544	5,096	5,728	12
Process Manufacturing	618	10	680	747	820	901	993	1,091	10
Transportation	280	9	306	332	365	394	420	448	8
Utilities	104	12	116	126	139	153	168	186	10
Telecommunications	533	12	599	679	761	850	964	1,086	13
Retail Distribution	752	7	804	858	915	992	1,061	1,130	7
Wholesale Distribution	517	6	547	576	605	631	656	681	4
Banking and Finance	1,004	11	1,113	1,229	1,345	1,475	1,626	1,779	10
Insurance	316	5	331	344	358	374	396	414	5
Health Services	975	8	1,055	1,113	1,183	1,277	1,356	1,464	7
Education	248	5	261	277	295	317	340	363	7
Business Services	890	9	970	1,059	1,158	1,263	1,380	1,506	9
Federal Government	1,115	34	1,492	1,584	1,674	1,759	1,851	1,945	5
State & Local Government	195	11	217	239	263	290	316	345	10
Miscellaneous Industries	521	7	555	592	631	656	695	730	6
Cross-Industry Markets	1,257	4	1,312	1,366	1,422	1,479	1,535	1,588	4
Accounting	500	-1	495	490	485	480	475	471	1
Education and Training	125	12	140	156	176	197	217	240	11
Engineering and Scientific	130	5	137	145	153	160	166	170	4
Human Resources	83	7	89	91	90	90	95	97	2
Office Systems	117	2	119	122	126	128	128	127	1
Planning and Analysis	0		0	0	0	0	0	0	0
Sales and Marketing	302	10	332	362	392	424	454	483	8

B

Forecast Reconciliation

The forecast reconciliations for applications software and turnkey systems are shown in Exhibits B-7 through B-9.

EXHIBIT B-7

1993 Database Reconciliation
Applications Software Products Market

Delivery Modes	1992 Market				1997 Market				92-97 CAGR per data 92 Rpt (%)	92-97 CAGR per data 93 Rpt (%)
	1992 Market (Forecast) ($M)	1993 Report (Actual) ($M)	Variance From 1992 Forecast ($M)	Variance From 1992 Forecast (%)	1992 Market (Forecast) ($M)	1993 Report (Forecast) ($M)	Variance From 1992 Forecast ($M)	Variance From 1992 Forecast (%)		
Total Applications Software Products Market	21,062	21,582	520	2	40,128	41,529	1,401	3	14	14
Vertical Industry Markets	11,992	12,025	33	0	22,662	23,639	977	4	14	14
Discrete Manufacturing	2,224	2,285	61	3	4,380	5,789	1,409	32	15	20
Process Manufacturing	683	683	0	0	1,378	1,466	88	6	15	17
Transportation	431	425	-6	-1	776	786	10	1	12	13
Utilities	225	224	-1	0	415	417	2	0	13	13
Telecommunications	410	411	1	0	1,008	1,010	2	0	20	20
Retail Distribution	302	302	0	0	557	557	0	0	13	13
Wholesale Distribution	587	585	-2	0	1,083	1,098	15	1	13	13
Banking & Finance	2,120	2,122	2	0	3,415	3,425	10	0	10	10
Insurance	891	891	0	0	1,819	1,681	-138	-8	15	14
Health Services	1,125	1,110	-15	-1	2,423	2,193	-230	-9	17	15
Education	740	745	5	1	1,247	1,306	59	5	11	12
Business Services	1,017	1,021	4	0	2,060	2,319	259	13	15	18
Federal Government	790	774	-16	-2	1,355	827	-528	-39	11	1
State & Local Government	190	190	0	0	350	360	10	3	13	14
Miscellaneous Industries	257	257	0	0	396	405	9	2	9	10
Cross-Industry Markets	9,070	9,557	487	5	17,466	17,890	424	2	14	13
Accounting	2,440	2,666	226	9	4,200	4,884	684	16	11	13
Education & Training	213	221	8	4	331	350	19	6	9	10
Engineering & Scientific	727	735	8	1	1,265	1,294	29	2	12	12
Human Resources	765	763	-2	0	1,400	1,400	0	0	13	13
Office Systems	2,671	2,897	226	8	5,439	5,031	-408	-8	15	12
Planning & Analysis	1,894	1,915	21	1	4,210	4,340	130	3	17	18
Sales & Marketing	360	360	0	0	621	591	-30	-5	12	10

EXHIBIT B-8

1993 Database Reconciliation
Turnkey Systems Market

Delivery Modes	1992 Market				1997 Market				92-97 CAGR per data 92 Rpt (%)	92-97 CAGR per data 93 Rpt (%)
	1992 Market (Forecast) ($M)	1993 Report (Actual) ($M)	Variance From 1992 Forecast ($M)	Variance From 1992 Forecast (%)	1992 Market (Forecast) ($M)	1993 Report (Forecast) ($M)	Variance From 1992 Forecast ($M)	Variance From 1992 Forecast (%)		
Total Turnkey Systems Market	12,483	12,265	-218	-2	18,402	18,853	451	2	8	9
Vertical Industry Markets	11,282	11,008	-274	-2	16,833	17,318	485	3	8	9
Discrete Manufacturing	3,097	2,940	-157	-5	4,975	5,096	121	2	10	12
Process Manufacturing	614	618	4	1	990	993	3	0	10	10
Transportation	302	280	-22	-7	495	420	-75	-15	10	8
Utilities	104	104	0	0	168	168	0	0	10	10
Telecommunications	529	533	4	1	932	964	32	3	12	13
Retail Distribution	754	752	-2	0	1,061	1,061	0	0	7	7
Wholesale Distribution	522	517	-5	1	731	656	-75	-10	7	5
Banking & Finance	1,010	1,004	-6	1	1,599	1,626	27	2	10	10
Insurance	316	316	0	0	396	396	0	0	5	5
Health Services	1,060	975	-85	-8	1,332	1,356	24	2	5	7
Education	247	248	1	0	347	340	-7	-2	7	7
Business Services	885	890	5	1	1,346	1,380	34	3	9	9
Federal Government	1,125	1,115	-10	1	1,450	1,851	401	28	5	11
State & Local Government	195	195	0	0	315	316	1	0	10	10
Miscellaneous Industries	522	521	-1	0	696	695	-1	0	6	6
Cross-Industry Markets	1,201	1,257	56	5	1,569	1,535	-34	-2	5	4
Accounting	450	500	50	11	520	475	-45	-9	3	-1
Education & Training	120	125	5	4	200	217	17	9	11	12
Engineering & Scientific	129	130	1	1	167	166	-1	1	5	5
Human Resources	85	83	-2	-2	95	95	0	0	2	3
Office Systems	120	117	-3	-3	130	128	-2	-2	2	2
Planning & Analysis	0	0	0		0	0	0			
Sales & Marketing	297	302	5	2	457	454	-3	1	9	8

EXHIBIT B-9

1993 Database Reconciliation
Applications Software Products and Turnkey Systems

Delivery Modes	1992 Market				1997 Market				92-97 CAGR per data 92 Rpt (%)	92-97 CAGR per data 93 Rpt (%)
	1992 Market (Forecast) ($M)	1993 Report (Actual) ($M)	Variance From 1992 Forecast ($M)	Variance From 1992 Forecast (%)	1992 Market (Forecast) ($M)	1993 Report (Forecast) ($M)	Variance From 1992 Forecast ($M)	Variance From 1992 Forecast (%)		
Total Turnkey Systems and Applications Software	33,545	33,846	301	1	58,530	60,381	1,851	3	12	12
Turnkey Systems	12,483	12,265	-218	-2	18,402	18,852	450	2	8	9
- Equipment	5,617	5,474	-143	-3	7,361	7,195	-166	-2	6	6
- Software Products	4,744	4,582	-162	-3	7,384	7,489	105	1	9	10
- Applications Software	4,127	3,897	-230	-6	6,498	6,551	53	1	10	11
- Systems Software	617	685	68	11	886	938	52	6	8	6
- Professional Services	2,122	2,209	87	4	3,657	4,168	511	14	12	14
Applications Software	21,062	21,581	519	2	40,128	41,529	1,401	3	14	14
- Mainframe	5,234	5,247	13	0	7,165	7,221	56	1	6	7
- Minicomputer	5,846	5,859	13	0	8,878	8,823	-55	1	9	9
- Workstation/PC	9,982	10,475	493	5	24,085	25,485	1,400	6	19	19

Applications Software

In looking at the applications software product market as a whole, there was an overall positive variance of 2% for 1992, compared to last year's projections. This variance was generally the result of higher-than-anticipated growth in the cross-industry office systems and accounting markets. The 1992 office systems cross-industry market benefited from pricing elasticity when PC products prices plummeted as a result of the price wars in the 386 microprocessor chip market. The accounting market is an early beneficiary of a significant number of new client/server product introductions. Accounting and administration applications are among the earliest

packaged software applications to be adapted to the client/server architecture. The cumulative effect of adjustment in the 1997 forecast for the applications software product market is a positive variance of 3%, as compared with last year's forecast.

The present five-year CAGR for the applications software market increased slightly from 14% to 15%.

A few industry-specific sectors in 1992 showed revenue growth slightly less than projected last year, including the federal government, transportation and health care sectors. The federal government and transportation (airlines and trucking) sectors experienced financial setbacks as a result of the economy. The health care sector has been hurt by potential buyers' indecision over the structural implications of health care reform. For the federal government, in particular, the five-year CAGR from 1992-1997 has been adjusted downward from 11% to 1%, reflecting major concerns about ongoing budgetary cutbacks. The current five-year CAGR 1993-1998 projection for the federal government market is 4%.

The strongest five-year CAGRs in the industry-specific applications software products markets are projected for the discrete and process manufacturing, telecommunications and business services market sectors. In particular, the five-year CAGRs for the discrete and process manufacturing and business services market sectors have been adjusted upward. The discrete and process manufacturing market sectors should be among the earliest beneficiaries of the new computer paradigm shift to client/server implementation, which could integrate the various automated islands of manufacturing and greatly enhance overall manufacturing efficiencies. The telecommunications sector will benefit greatly from the structural changes taking place in the industry to allow many more information services products to be delivered directly to the home market. Acceleration in the forecasted growth rate in the business services market sector reflects the continuing relatively faster growth rate in the services sector of the U.S. economy.

In the cross-industry applications software products market, variances in the 1992 market growth rate forecast were either neutral or quite positive. The biggest variance in the five-year CAGR forecast for the cross-industry markets was in the accounting sector, with a 16% positive variance in the anticipated market size in 1997 of this cross-industry market sector. This reflects acceleration expected in client/server products for this market sector, which INPUT believes will be generally additive to market size. The office systems market sector, however, shows an 8% negative variance from the prior forecast on the 1997 market size. The office systems market is beginning to suffer significant price reductions in applications

software product offerings, which is particularly evidenced in the bundled suite product offerings. Price declines are likely to continue as product commodization becomes an increasingly important factor in this cross-industry market.

Turnkey Systems:

For turnkey systems, 1992 expenditures were 2% less than projected. However, expenditures for 1977 show a positive variance of 2% as compared with last year's projections.

Industry-specific variances in actual versus project 1992 market sizes were concentrated in the transportation (-7%), health care (-8%) and discrete manufacturing (-5%) sectors. In the five-year 1997 market forecast, the federal government shows a 28% positive variance, reflecting continuing preference in federal government spending for turnkey systems desktop applications.

In cross-industry areas, negative variances in 1992 from previous year's projections were in human resources and office systems, which reflects a continuing preference for the unbundling of solutions in many commercial markets for such applications.

Applications Software Products and Turnkey Systems (Application Solutions):

Variance in the reported 1992 market size for the combined turnkey systems and applications software products market was a positive 1%. The 1997 forecasted market size shows a positive variance of 3%. The five-year CAGR forecast for 1993-1998 is now 13% compared to the previous five-year CAGR for the 1992-1997 period of 12%.

The most significant individual variance in this market is in professional services, which shows a positive 14% variance in the forecasted 1997 market size from our year-earlier forecast. This also underscores INPUT's continuing advice that applications solutions companies must switch toward services/consulting delivery modes to show good growth and remain competitive.

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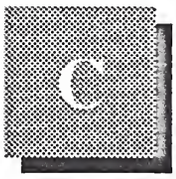

Questionnaire—Vendors Applications Solutions

The following questionnaire is being addressed to a number of applications software product and services vendors. Responses from the survey will be used to develop INPUT's annual report on the Applications Software /Turnkey Systems Industries. The report will include chapters on market size and market growth rates (by vertical and cross-industry); leading trends and issues; and strategic product and services recommendations for vendors addressing these industries.

1. Generally describe your overall applications solutions (applications software, turnkey systems, application development tools and complementary services) product offering.

_____

_____

_____

_____

2. What was the approximate size of your company's revenues in your last fiscal year?

____ 1) Less than $50 million
____ 2) Between $50 million and $250 million
____ 3) Between $250 million and $500 million
____ 4) Between $500 million and $1 billion
____ 5) More than $1 billion

3. What was the approximate revenue growth of your company in your last fiscal year?

____ 5) More than 30%
____ 4) 20% to 30%
____ 3) 15% to 20%
____ 2) 10% to 15%
____ 1) Less than 10%

4. What was the approximate percentage breakout of your total applications solutions revenues in your last fiscal year?

____ "Standard" licensed application software product revenue
____ Software maintenance revenue
____ "Customized" application software product revenue

____ "Other" complementary services (systems integration, consulting, education, and training) revenue
____ Application development tools/other systems software licensed product revenue

5. Has there been a significant percentage shift in revenue sources as described in question No. 2 in recent years? ____Yes ____No
Explain

_____
_____
_____

6. List/describe new product introductions from your company over the past year that provide distributed processing (client/server) solutions.

_____
_____
_____
_____
_____
_____

7. Describe the magnitude of impact that the shift to distributed (client/server) computing has had on your revenue growth over the past year.

____ 5) Very positive
____ 4) Slightly positive
____ 3) Neutral
____ 2) Slightly negative
____ 1) Very negative

8. From the perspective of your client demand, how do you perceive the shift toward distributed (client/server) processing impacting the product/growth outlook for your company over the next five years?

_____
_____
_____
_____

9. Describe any changes in hardware platforms supported over the past two years.

_____
_____
_____
_____

10. What operating system software platforms do you currently support?

_____

_____

_____

_____

11. What additional operating systems software platforms (from the list below) do you consider most important to support over the next five years? (In order of magnitude, 5 represents the most important.)

Windows NT, UNIX, Object-oriented (Cairo, Taligent, etc), Chicago (Windows 4.0), OS/400, OS/2, MVS, Other (specify)

_____5)
_____4)
_____3)
_____2)
_____1)

12. What do you consider to be strategically important de facto/de jure computer hardware/software/communications standards to support over the next five years?

_____, _____, _____, _____
_____, _____, _____, _____

13. Describe the nature of any strategic alliances you have made over the past 1-2 years, as well as how you might utilize strategic alliances in the future.

_____

_____

_____

_____

14. What type of application development tools do you consider most important for future software application development?

_____, _____, _____, _____

15. Describe changes in your product license and maintenance contract policies over the past year.

_____

_____

_____

_____

16. What has been typical of pricing in your traditional product line in the past year?

_____5) No change in traditional pricing practices
_____4) Prices increased in line with inflation
_____3) Experienced modest unit price decline
_____2) Prices reduced as a result of changes in product line
_____1) Prices declined from changes in product licensing and maintenance contract policies

17. What general changes do you believe will occur in the applications solutions markets over the next five years?

_____
_____
_____
_____

18. How will these changes impact the revenue growth rate for application solutions vendors over the next five years?

_____ 5) Very positive
_____ 4) Slightly positive
_____ 3) Neutral
_____ 2) Slightly negative
_____ 1) Very negative

Thank you very much for your participation.

Mary A. Raymond